The Effects of Environmental Variations in Day Care Centres on the Development of Young Children in Singapore

Celina K. D. Kwan
1997

Thesis submitted in fulfillment of the Doctor of Philosophy Degree awarded by the University of London

ABSTRACT

The purpose of this study was to investigate the effects of variations in the day care environment on linguistic and social-emotional development of pre-school children in Singapore after home background has been taken into account.

This study examined differences in the environment of 16 day care centres. Characteristics of the environment were assessed by the Early Childhood Environment Rating Scale, ECERS (Harms & Clifford, 1980) and the Target Child Method of Observation, TCM (Sylva, Roy & Painter, 1980). The ECERS measured the physical and programmatic features of day care centres and produced a total 'quality' score and seven subscale scores. These consisted of assessments of *personal care and routines*, *furnishing and display*, *language-reasoning experiences*, *fine and gross motor activities*, *creative activities*, *social development* and *adult needs* provided in day care centres. This rating scale was validated in Singapore and discriminant validity was established. Reliability was also obtained before proceeding with the assessment of the day care environments. The TCM investigated the interactive features of day care centres and consisted of typical activities and social interactions experienced by children. Inter-observer reliability was established and child behaviours were systematically observed and coded for 12,800 thirty-second intervals.

Day care effects were investigated by assessing children at two time points. A pre-test,

consisting of linguistic and social-emotional assessments, was conducted on 122 pre-school aged children at the beginning of the year and a post-test administered towards the end of the year. Data analysis was conducted by regressing these outcomes on the ECERS measure of the day care environment. T-test analyses were also conducted to investigate differences in typical child behaviours (as measured by the TCM) between 'high' progress centres and 'low' progress centres. Child characteristics and home background variables were included in the analyses to control for possible confounding of the effects of the day care environment on children's outcomes.

This study found that total centre 'quality' and specific subscales on the ECERS were related to some aspects of linguistic and social emotional development of children. Results also suggested that certain child activities and social interaction were associated with higher progress in language development.

ACKNOWLEDGEMENTS

There are people whose invaluable love and support have helped me complete this research and I wish to thank.

Professor Kathy Sylva, for her astute guidance and supervision of this research, for her challenges and encouragement to investigate reflectively and for her devotion in giving me an all-round research experience. More importantly, for her friendship when it felt difficult at times.

Dr Ian Plewis and Dr Barney Reeves, for their constructive feedback on statistical analyses and interpretation.

Research assistants, Tan Bee Hoon, April Lee, Chong Yoke Lee and Rebecca Tan, for their resilience in collecting the data especially for so little money or none at all!

Directors, supervisors, teachers, parents and children of the day care centres, for their co-operation, hospitality and openness towards me and my research.

My friends, Hyun Yee Lee, who devoted her time to data entry and typing tables; and Andrew Burrell for proof reading and comments.

Professor Kuno Beller, Dr Kirby Deater-Deckard, Dr Julie Hadeed, Dr Maria Jose-Lera, Maria (Milita) Nabuco, and Dr Donna White for their comments and suggestions on various parts of the thesis.

Friends and fellow research students in Child Development and Learning, Room 520, for lending me their ears over a cuppa!

Dr Marilyn May Ling Quah and colleagues at the Division of Specialised Education, National Institute of Education, Singapore, for keeping the workload going with one less staff.

Nanyang Technological University, National Institute of Education, Singapore, for their sponsorship.

Dad, mom and siblings for their love and confidence in me.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

CHAPTER ONE: INTRODUCTION

1.1 Introduction

The study of the education and care environment of the child is of considerable value to both parents and professionals. The notion that the behaviour of the child develops from interaction with the environment is central to most research on the effectiveness of early childhood services. The impact of services such as family day care and centre day care on children's development has important implications for society as a whole.

In general, investigations into the immediate environment of the child can be broadly grouped into those within the home and those outside of the home where both education and care can be offered. Harms and Clifford (1993) in their description of different education and care environments cited Hill's (1900) taxonomy of early childhood educational settings. In the taxonomy, two main settings are conceived: home settings and centre-based settings. A child can be cared for in a home setting which can either be in the child's own home or a family day care home. Alternatively, a child can be placed in a centre-based setting which can either involve a part day programme or a full day programme. The choice of settings made by parents is dependent on the family circumstances such as financial and time constraints, location, job and family values.

Using one of these settings, that is centre-based, this study aimed to examine full day centre-based care environment of Singaporean pre-school aged children and how variations in this environment affects their linguistic and social-emotional development

over one school year. This study also considered the impact of the family environment on children's development and investigated the relationship between the centre-care environment and family environment as they affect children's development.

This chapter begins with some definitions of terms used in research on day care. This is followed by a review of the broad theoretical framework under which most research into the effects of pre-school care is conducted. Bronfenbrenner's (1977, 1979a, 1979b) ecological approach is central here to examining the micro and macro contexts of child development. This approach explores the relationships between hierarchical spheres of influence on human development and places the immediate environment of the child in this wider social context. Harms and Clifford's (1993) application of Bronfenbrenner's framework to the investigation of various components in society that can be related to the education and care setting of the developing child is discussed next.

Variations in the day care environment of any one country can be shaped by the social structure of that nation producing a particular pattern of day care provision and this in turn can influence child development (Melhuish, 1991a). Therefore, the next section in this chapter examines the international context of day care research and cites Sweden, U.S.A. and Britain as examples. Sweden is examined for its high priority in supporting working parents and rigorous state regulation of day care centres. The United States and Britain are discussed for their values in keeping the family responsible for child care and their diversity of forms of alternative care for children. Next, the historical development of Singapore's day care system and its features are discussed to place this study in the national as well as international context.

This is followed by a review of attempts to explain the notion of 'quality' in relation to existing empirical research on the effects of day care environments. Finally, a review is conducted on some methodological frameworks used in research in this area and includes the research framework for this study. The statement of the problem and main research questions are presented.

1.2 Definitions of terms used in this study (Singapore usage)

'Day Care'

Day care refers to a service offered by individuals or organisations to care for children during the day while their parents work. Day care is non-parental and can consist of family day care and centre day care.

'Family Day Care'

This type of care is provided in a home setting other than the child's own. The caregiver is usually licensed and cares for a small group (less than five children, depending on ages) of children during the day.

'Centre Day Care'

This type of care is provided in a centre setting in which the physical facilities and programme are organised to provide for larger groups of children. Table 1.1 shows the required staff-child ratio in Singapore centres.

Table 1.1

Programme Staff-Child Ratio Specified by Ministry of Community Development, Singapore

Age of Children	Programme Staff-Child Ratio
2 months - 18 months	1:5
Above 18 months - 30 months	1:8
Above 30 months - 3 years	1:12
Above 3 years - 4 years	1:15
Above 4 years - below 7 years	1:25

In Singapore, most children attend a full-day programme which has both educational and care aspects. Please refer to appendix A for a typical time table of programme.

'Home Care'

This refers to children cared for in their own home by their parents.

'Pre-school Programmes'

Pre-school is used in this study to refer to any type of programme that caters to children who are not yet attending the first year of formal school. 'Early years' education is used synonymously with 'pre-school' education also.

'High Risk Children'

This refers to children who come from socially and economically deprived background such as low family income, low level of parental education and unskilled parental occupations.

1.3 Theoretical context of the study

Examining the day care setting and its impact on child development needs to be seen in the larger context of a child's overall environment. Features in this larger environment can indirectly shape the day care experiences for children and hence their development. An attempt is made by Bronfenbrenner to identify and describe the relationships between social institutions within a society and how these are connected to the developing child.

Bronfenbrenner's (1977, 1979a, 1979b) description of the ecology of human development involves four levels of influences that can directly and indirectly shape children's immediate environment and hence their development. These are "conceived topologically as a nested arrangement of structures, each contained within the next" (Bronfenbrenner, 1977, p. 514). The immediate setting, the 'microsystem', contains the children who are involved directly in activities and roles, e.g., activities that involve being a son or daughter or a child in a day care centre. The level surrounding the 'microsystem' is the 'mesosystem' which consists of an interrelation of settings the children are in, e.g., the home, the school, day care centre or the peer group. The next layer, 'exosystem', contains the major institutions of society that can be the neighbourhood, the government or the mass media. The outer most layer is the 'macrosystem' in which Bronfenbrenner cites the culture or subculture as a sphere of influence that identifies a given society. He contends that the interactions within and between these layers shape the immediate environment of the child and investigations into their development need to take these into account.

Harms and Clifford (1993) attempt to place Bronfenbrenner's framework into the study

of day care settings for pre-school children. With reference to figure 1.1, the main features within each layer of influence that directly and indirectly affect the immediate educational and care environment of the child are identified. In the outer layer of influence, the 'exosystem', are forces such as the state government, community, economic climate and higher educational system. The next layer, nearer to the immediate setting of the child, is the 'mesosystem' that contains features like regulation, quality improvement efforts, teacher training and support, sponsorship, funding and the family. The innermost layer, the 'microsystem', is the educational and care setting of the child.

In their application of this ecological framework, Harms and Clifford explain that features in the 'mesosystem' can affect the effectiveness of the day care environment. Lack of regulation and/or differential regulation between states can cause variations in day care provisions for children. This is also applicable to the degree of funding, the availability of teacher training, and sponsorship. The family circumstance, for example, financial, social and emotional status, is another feature in the 'mesosystem' that has currently been an important feature in research into variations in the day care environment for children. This is explored in chapter two of this thesis. The outermost area of influence, 'exosystem', has an indirect impact on children through adults as it encompasses the government, economical climate, community and education system.

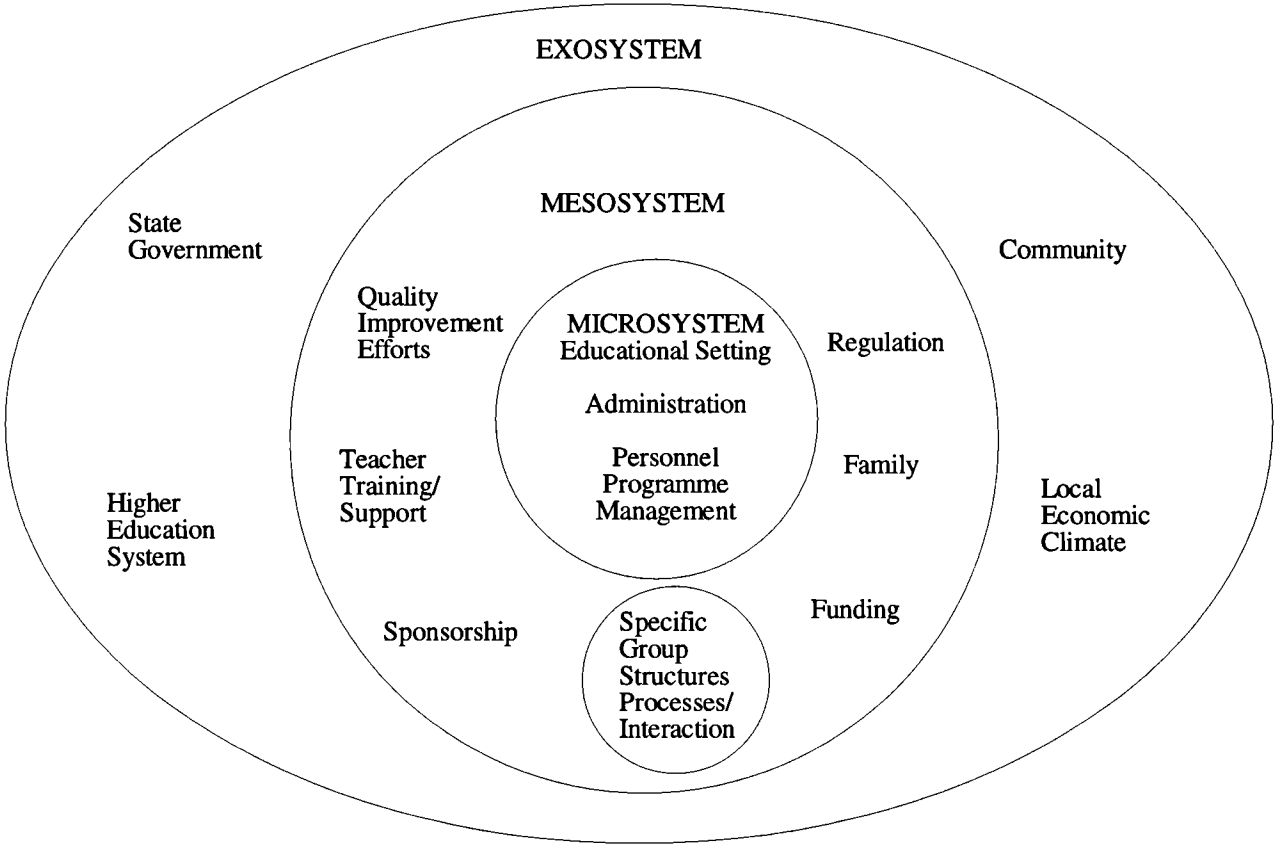


Figure 1.1. Theoretical framework for assessment of early childhood settings
(Adapted from: Dimensions of Learning Environments; Rossbach, Clifford & Harms, 1991)

Evidence of these outer layers of contextual influence, 'mesosystem' and 'exosystem', can be explored within and across countries. Particular features of social and policy change within a country can account for the nature and unique characteristics of day care provisions for children. This diversity of day care environment needs to be investigated in order to identify what would best enhance the development of children.

1.4 International research context of the study of variations in day care environment

A review of the ideology of day care provision and some policies implemented by different countries is explored in this section. The aim is to explore an indirect influence of the larger context on the development of children. Various policies and decisions made by the state, policy-makers and the community may have a bearing on the evolution of the day care system unique to each country. This system is the educational and care environment that can have an impact on children's development. In this section, Sweden is examined for its reputation in providing 'high quality' child care for working parents, the United States and Britain are discussed for keeping the responsibility for child care within the family and their diversity of forms of day care for young children. Finally, the development of Singapore's day care provision is explored extensively to place this study in an international research context.

1.4.1 Day care system in Sweden

In Sweden, provision of day care for young children is seen as an entitlement for all families and as such the State and municipalities subsidise the cost of provision substantially. The reasons for this priority for affordable and accessible day care service stem from Sweden's concern over the country's low birth rate and need for women to join

the labour force. In fact, it appears that policies involving child care provisions were made with the support of working parents first in mind and the interest in children's well-being was secondary. This was evident in the 1974 Parental Leave Act in which the children's well-being was not cited as one of the reasons for the act (Hwang, 1991).

In practice, this ideology is reflected in the State's paying a share of 47% of the cost of child care. This is covered by a "child care charge" which is a social insurance contribution from all employers. In addition, the municipalities subsidise 43% of the cost and this is covered by taxes. So parents need to contribute only 10% of the cost of a place in the day care (Broberg & Hwang, 1991). Evidence for influence of the larger context referred to by Bronfenbrenner as 'exosystem' and 'mesosystem' is shown in that the Swedish state's decision (an aspect of the 'exosystem') has made it easy for parents to work (an aspect of the 'mesosystem') as high state subsidy has alleviated financial constraints for parents to place children in care outside of the home.

The 1974 Act entitlements also influenced children's age of entry into day care and the amount of time spent in care. In Sweden, both parents are entitled to nine months full-time or 18 months part-time leave from work after the birth of their child, with 90% of their earnings paid and this can be taken at any time till the child is four years old. In addition, 90 days of leave per year per child can be taken up to care for children when they are sick or their normal caregiver is sick. This includes two "contact" days of leave to visit the child's care environment (Broberg & Hwang, 1991; Hwang & Broberg, 1992). With these entitlements for parents to care for their children during the first year of their life, the age of admission into out-of-home care in Sweden has rarely been under the first

year of infancy. For children who are already in day care, they are found to be spending less time in care outside of home and this is the result of parents being able to reduce their working hours.

The State's decision to entitle parents to care and spend time with children during the first year of life is complemented by the high standard of provision required in the day care centres. Most alternative care facilities fall into three categories: private centre day care, municipal centre day care or family day care. The Board of Health and Welfare licenses these provisions and requires high standards in the structural aspects of the day care environment. These are in relation to physical facilities, staffing and training, group size and adult-child ratios. So children are assured not only of a place in day care but also provisions that are regulated to high standards.

It can be seen that the system of child care provision in Sweden is a state concern. The state takes on the responsibility for providing for parents and administrating day care facilities. It can be argued that Sweden's day care situation is characterised by highly regularised day care environment because of the degree of state involvement. This is evidence that the unique character of the Swedish system has been shaped by the larger context as represented by the state.

However, despite Sweden's enviable and unique benefits of parental and child support, Hwang (1991) noted some shortcomings of the system. Lack of diversity in the day care system can also mean that parents have limited choice in type of care for their children. This is because policy-makers are in favour of public day care and although there is choice

for parents to work, there appears to be lack of choice in form of care for their children. Other forms of care are not funded and therefore, perhaps not readily available or not of high standard.

Research studies in Sweden have involved comparing the effects of the different forms of care on children's development (Cochran, 1977; Andersson, 1989, 1992; Karrby, 1988; Lamb, Hwang, Broberg & Bookstein, 1988; Lamb, Hwang, Bookstein, Broberg, Hult & Frodi, 1988) and these are referred to in the literature review in chapter two.

1.4.2 Day care system in U.S.A.

In contrast to the Swedish day care system, the American ideology behind state provision of care for pre-schoolers is not viewed as "a right of children or a need of employed parents" (Clarke-Stewart, 1991, p. 46). The idea of a family is one of self-reliance and mothers are viewed as the main person in bringing up children. Therefore, child rearing is seen as a family responsibility and the care of children should not be left to the state as it is feared that this may encourage the breakdown of the family unit.

Based on this ideology, decentralisation and privatisation is encouraged by the Federal government resulting in a lack of public funding. This created a heavy reliance on the private sector and exposed the system of day care provision to 'free market forces' which is now seen as a business opportunity rather than a social service for the community.

Future plans are being formalised to establish uniform standards of day care provision through the Act for Better Child Care Bill, the diversity of standard in day care provision

is made worse by rapid social changes. For example, welfare legislation requires recipients to go to school or get a job, there is an increase in single parent families and with economic recession there is a need for extra family income. Therefore as women need to work, the demand for alternative child care service increases (Phillips, 1991).

There exists some support from the Federal government, for example, families are able to deduct 20-30% of day care costs from taxable income but parental leave is not provided. More public subsidy is available for family day care, possibly because this form of care is viewed as the next best alternative to the child's own family. Grants are also given to states and communities for social services for low income families.

One major support from the Federal government is seen in the form of funding intervention programmes, such as the Head Start programme, as part of the purpose to break the cycle of poverty among the disadvantaged families, especially the non-whites. This programme aims to give children from impoverished home backgrounds the skills needed to succeed in school (Zigler & Styfco, 1994). What started as a summer programme, has now developed into a full community-based programme for the disadvantaged children. However, the purpose of this programme is not to support working mothers in caring for their children but it is an intervention programme for disadvantaged children whose mothers are mostly unemployed.

It is evident that aspects of the outer influence in the social environment, for example social policy-makers, is directly shaping this variation in the standard of day care provisions. Clarke-Stewart (1991) noted that the decentralisation and privatisation of

provision of day care gave way to unequal access to proper care and education for pre-schoolers. This is seen in wealthy families being able to enrol children in better facilities and low income families given entitlement to better standards of provisions in public funded centres. However, the working class and middle class families are only able to opt for barely adequate centres for their children.

The current situation in the U.S.A. has fuelled numerous investigation into the effects of alternative care for young children. Research has focused not so much into the effects of day care attendance on children's development per se but the effects of variations in the day care environment. The National Child Care Staffing Study by Whitebook, Howes and Phillips (1989) is one such study that investigated variations of provisions across five states. Others include Howes (1983), Roupp, Travers, Glantz & Coelen (1979), Vandell, Henderson & Wilson (1988), Burchinal, Lee & Ramey (1989), Dunn (1993), Howes, Phillips & Whitebook (1992), Kontos & Dunn (1993).

In summary, it is evident that the lack of state support and greater reliance on private sector to provide child care services in U.S.A. has led to the variation of standards in day care environment. This is in contrast to Sweden in that less variation in the day care environment is developed by more regulation and support from the state. However, a similarity can be seen in the two countries; that is limited parental choice. In the case of Sweden, parents are restricted to centre-based care because of the state's preference for centre care. For the U.S. parents, social economic status limits their 'quality' of day care. This points to an important consideration in the relationship between the degree of parental choice and social background on examining the effects of variation in the day care

environment on children's development.

1.4.3 Day care system in Britain

In terms of the ideology behind provision of child care in Britain, it appears similar to the U.S.A. The British government appears to view child care as the parents' responsibility and provision for any alternative care for their children should be arranged privately. If there is any support from the state, it is providing for children who are in special and disadvantaged circumstances.

The 1989 Children Act affirmed this stand and gave local authorities the task of regulating private day care and providing day care for children in need. Day care services for the other children is provided at the local authority's discretion (Melhuish & Moss, 1991) however, tight expenditure has made it difficult for them to cater to the majority of the children who are not "in need". As a result of this social policy, Sylva & Moss (1992) reported a 5% decline in available places in public nurseries between 1980 and 1991. Consequently, only one-fifth of children under five years of age benefit from public funding as compared with 40% of under fives in some other parts of the Europe (Moss, 1991).

Other social changes such as the recession of the 1980s, a need for extra family income, a decline in number of young people leaving school have caused more women to join the work force. This led to the demand for alternative care of children and because of lack of public support, a massive increase of 259% in places in private nurseries was seen between 1980 and 1991 (Sylva & Moss, 1992).

Private and public forces have also created a diversity of forms of child care in Britain. In all, there are seven major types consisting of childminders, local authority day nurseries, private day nurseries, nursery schools, infant classes, playgroups and private nursery schools. Playgroups provide the most places (60%), however, these are usually for two to three hours in the day (Ball, 1994) and mainly run by parents. Of these provisions, childminders, local authority day nurseries and private day nurseries cater to children who need day care and whose mothers are working.

However, the impression that diversity may allow for more choice for parents is possibly superficial. Moss (1991) noted that publicly funded childminders and centres are available only to disadvantaged children and not to the average working class parents who need the service as much. Availability may be limited by the borough in which parents live. High 'quality' private day care centres are only available to high income families who can afford to purchase these places.

In sum, like the American situation, the diverse forms of day care in Britain discriminates children and parents by social economic status and geographic location. The external influence of public policy and family characteristics shape the type of day care environments for children. Again, this feature of the British system can have implications for research on the effects of day care on children and needs to be taken into account in effectiveness research. In general, British studies have involved a comparison of the effects of the various forms of care such as Melhuish, Lloyd, Martin and Mooney (1990a), Hennessy, Martin, Moss and Melhuish (1990b), Lera, Owen and Moss (1996), Sylva and Jowett (1986) and Sylva, Roy and Painter (1980). A new study, a five-year longitudinal

research, recently embarked by Sylva, Melhuish, Sammons and Siraj-Blatchford (1996) and funded by the Department for Education and Employment will investigate the effects of different kinds of early years education in Britain. It is the first major study that will use multi-level modelling in data analyses and aims to investigate the different characteristics and kinds of pre-school provisions and their impact on a large sample of children.

1.4.4 Summary

From examining the day care systems of the three countries, it can be seen that the larger context of the social environment, as represented at state and community level, to some extent shape the types of child care provision for young children. There can exist a diversity of provision and variation in the standard of the day care environment which are influenced by the degree of support from governing bodies. The impact of these variations can be of vital consequence to children's development. In addition, other aspects of the broader social context like degree of parental choice which is dictated by social economic and geographic constrains can intervene in the effect of the day care environment on child development.

The influence of the larger social context found in social and economic sectors of a nation is also seen in Singapore's development of the day care system for children. The following section charts the historical development of day care provision and how social and economic changes shaped the pattern of this provision in the country.

1.5 Singapore national research context of the study

Although substantial research has been conducted over the past two decades regarding the effects of day care on children in countries like U.S.A., Britain, Sweden and other countries mainly in the west, it is only recently that Singapore has begun to recognise the need to develop alternative child care for the working parents and to carry out research on it. Some demographic information and a historical survey of the development of child care provisions in Singapore is described to set this present study in context.

1.5.1 Child care provision before the 1960s

After the Japanese Occupation of Singapore in 1945, the British Military Administration took on the onerous task of reorganising the country. In order to provide and alleviate social problems created by the destruction of the war, the Department of Social Welfare was formed in July 1946 (Department of Social Welfare, 1946) to rescue the destitute and homeless, especially children who fall prey to prostitution and delinquency. Child Feeding Centres were formed in 1947 (Department of Social Welfare, 1975) for children between ages 2 and 6 years who suffered from malnutrition after the second World War. The feeding centres later became Children's Social Centres that provided food and medical care with some informal and vocational training for these children who could not afford to attend private kindergartens and regular schools.

Besides the Children's Social Centres, provisions in the form of day care for young children in Singapore began in 1942 during the war to help care for dislocated children and served as a custodial service for mothers working in the reconstruction effort of the country (Seng & Lazar, 1992). There were two creches, run by the Child Welfare Society

in 1942, these were taken over by the government in 1949, and assumed responsibility for the day care provision of young children since (Department of Social Welfare, 1975).

Besides government-run day care provision, other voluntary and private agencies began to set up similar provision mainly in two forms. One form is the 'kindergarten' which is an academically oriented, three to four hour programme usually attended by children who do not require out-of-home care; the other is the full-day child care centres or day care centres which provide out-of-home care for working parents along with an academic programme.

1.5.2 Child care provision after the 1960s

After World War II, Singapore faced labour problems as the population started to increase rapidly in the 1960s (Ong, 1977). The lack of natural resources, a small domestic market, the need to export and the British pull-out led to the need to develop industries, tourism and finance for the small country to survive (Chang, 1993). This move towards industrialisation saw an increase in labour participation and by the 1980s, the average annual rate of increase was 2.5% between 1983 and 1994. It has also been noted that during these past ten years, the average annual labour growth rate for females was higher than that for males, that is 3.6% compared with 1.8% respectively (Ministry of Labour, 1995). This can be attributed to the government's attempts to encourage women to return to the labour force to help sustain the economic growth for a small country with limited natural resources.

As human resource is vital to continued growth for the future economy of the country,

the government has been encouraging an increase in birth rate. With the increasing population of young children and more women returning to work, provision of care for young children was and continues to be under serious consideration.

1.5.2.1 Day care incentives for parents

The Day Care Section of the Ministry of Social Affairs was set up in 1980 (Ministry of Social Affairs, 1980) to improve day care services for children and to explore incentives to motivate women into the work force as well as having more children. One such incentive, introduced in 1985, was the provision of subsidy for parents who enrol their children into day care centres (Ministry of Community Development, 1993). This subsidy amounts to about 40% of the cost of centre fees and is fixed regardless of choice of centre and independent of the family income. Therefore, if the family cannot pay the difference in day care fees after the subsidy, it is seen not to be economically sensible for the mother to participate in the labour force and she is better off caring for her children at home. Unlike most countries in the west, where day care is seen as performing a compensatory role for the poor and disadvantaged, Singapore's concept of day care, like Sweden, is seen as an entitlement for both children and working parents (Seng & Lazar, 1992). Needless to say, this has led to a dramatic increase in enrolment which rose from 2,375 children in 1984 to 22,945 in 1994 (Department of Statistics, Singapore, 1994).

It has also been noted that although some parents have domestic help at home, they still enrolled their children in day care centres. This is because education is valued by most Singaporean parents and it is felt that the longer hours of attendance at day care centres will give their children a headstart in school. This view was found by Seng (1994) when

she investigated 437 parents' expectations of the role of pre-schools for their children. She found that parents cited exposure to formally structured learning environment, acquiring basic cognitive and language skills and an academic-oriented programme as their reasons for sending children to pre-schools.

1.5.2.2 Incentives for day care operators

Another incentive, introduced in 1985 by the government, was in the form of subsidies to potential day care operators. Interested operators are given a capital grant of up to $40,000 (approximately £18,181 GBP) to convert space to day care centres and a one-time subsidy to equip the centre (Ministry of Community Development, 1993). There is also priority given to those who would set up their centres in the 'void decks' of government housing estates. (These are empty areas under blocks of government flats, on the ground level, that can be converted into small supermarkets, sundry shops, or any other small businesses by private entrepreneurs.) The government pays the 20% levy of conversion costs imposed by the Housing Development Board for all 'void deck' day care operators as these areas ensure accessibility to larger numbers of children. In addition, subsidies for losses incurred during the initial months of operation are available to non-profit organisations and workplace centres.

1.5.3 Consequences of the day care incentives

As these incentives begin to see more women joining the labour force and the increase in birth rate, two areas of concern emerged in the development of the day care system in Singapore. One is the rapid rise of children enrolled in day care centres and the long hours in group care, a phenomenon which has received little research to date. The

Department of Statistics reported an enrolment of 2,375 in child care centres in 1984 and 22,945 in 1994 (Department of Statistics, 1994). This ten-fold increment is still on the rise. The hours spent in centres can be as long as 12 hours a day for some children. This is a requirement of the Ministry of Community Development for operators to cater for parents working long hours. However, it is stipulated that children should not be cared for more than 24 hours continuously in their guide to operating child care centres. It appears that with more options open to parents, children can spend long hours away from home and their parents.

The other is the concern that demand for day care places has caused a rapid growth in number of day care centres which is seen as profit-making opportunities by the more business-minded members of the public. The Straits Times, Singapore's national newspaper (see appendix B) reported that centres are 'opening faster than teachers can be hired and trained'. It reported that 228 centres offered 15,000 places for children and with only a total staff strength of 2000. The Ministry of Community Development announced plans to license 100 more centres in the next five years. This increase of centres has outgrown the availability of trained staff and to cope, staff are often untrained and do not meet the minimum requirement of qualifications. Untrained teachers wait to be enrolled in training courses run by a national teacher training college in Singapore and three other training agencies. This means that there is a body of untrained staff employed in centres and it is possible that there may be a variation of appropriate teaching practice and curriculum among the day care centres in Singapore. This variation in environment is also made worse by the problem of a high turnover rate in staff, especially with the rapid increase in new day care centres offering higher salaries and better working

conditions.

Although the Ministry of Community Development conduct annual inspection of these centres to renew license to operate, regulation is limited to the structural environment like physical facilities, health, hygiene and safety checks, adult-child ratios, administration and record-keeping. Dynamic aspects of the day care setting such as teaching practice in specific curriculum areas, although listed in the official evaluation checklist, is hardly dwelled upon since inspectors are limited to one day's visit to each centre.

Given the circumstances described above, this possible variation in the day care environment is cause for concern especially for parents, educators and licensers. There have been some studies in Singapore investigating the intellectual, bilingual and social development and play behaviour of pre-schoolers in Singapore (Ko & Ho, 1992; Seng, 1992; Lim, 1994). However, there has not been specific investigations into the effects of the day care environment on child outcomes. Although there exists some studies on the features of the pre-school environment (Sharpe, 1994), rigour in the research designs has not been tight and therefore it has been difficult to make policy decisions based on firm evidence.

This is because pre-school studies in Singapore have not included pre-assessments of child outcome nor was there random assignment of children. Also, studies to date in Singapore have not taken into account the effects of the day care environment in relation to the effects of the family environment on child development. Due to these limitations there is a call for adopting a more ecological approach to research of this type. The major aim of

the research reported here is to apply more rigorous methods to research questions concerning the effects of day are in Singapore.

1.5.3 Statement of the research problem

The research problem is one of determining the effects of variation in day care environments on children's linguistic and social-emotional development after taking family factors into account. This study is confined to the context of centre-based full-day programmes.

1.6 Effectiveness of the day care environment

The effects of a diversity of day care environments, their forms and features, is the focus of many investigations in relation to children's progress. Most researchers look at the 'quality' of these environment which can be interpreted in various ways due to it having a value label. This section explores the various notions of 'quality' and reviews attempts to define the meaning of 'quality'. This review also includes an examination of how 'quality' can be measured in relation to the day care environment.

1.6.1 The nature of quality and the day care environment

In looking at the nature of 'quality' in the day care environment, Katz (1994) adopts a multiple-perspectives approach. She argues that in examining the day care environment, one needs to take on a broader set of perspectives in order to evaluate its effectiveness in enhancing early childhood development. In identifying the characteristics of the day care environment, she suggests five perspectives in looking at the 'quality' of day care programmes. A commonly used perspective is the 'top-down' perspective which usually

involves programme administrators and people in charged of licensing child care centres. This group of evaluators examine 'quality' in terms of the more structural characteristics of the programme, e.g. staff-child ratio, staff qualification, health and safety, nutrition, space and equipment. These structural dimensions have sometimes been called 'regulatable aspects' of day care.

A second way of looking at day care 'quality' is to use the 'bottom-up' perspective in which one can look at the day-to-day experience of children in the centre. Katz suggests that children's experiences in the day care centre can indicate the effects of the environment. Any attempt to identify these experiences at child-level requires close interaction with the children and careful observation of child behaviour to allow accurate inferences on how children are involved in the centre.

Another way of identifying the 'quality' of a programme is through the parents, which Katz calls the 'outside-inside' perspective. Parents will be concerned about how centres provide for their children and they will want the best provisions. Their perceptions of what is 'good for their children' can also be studied. The main area of concern in this perspective would be to identify the degree of mutual agreement or disagreement between parents and teachers and whether they are able to communicate the dimensions along which they make their judgements.

A fourth perspective is called the 'inside' perspective, which uses the staff's view of looking at the day care environment. Katz lists three factors in which one can examine the effectiveness of environment from their point of view: relationship between colleagues,

staff/parent relationship and organisational climate. This is important as a positive and enriching environment for children cannot be created if the working climate for adults is not a conducive and positive one.

A fifth perspective is the 'ultimate' one that involves the society at large. If child care programmes fail to develop children's abilities, families and society will be disadvantaged and will have to face the negative consequences of children not getting a good start in life. So, how well a programme will perform is dependent on those agencies that sponsor them, and the policies that they make to enhance children's experiences through their environment. From this point of view, one may identify policies and decisions made in administering public and private day care provisions. For example, one might look at how and whether sufficient resources are channelled to enhance programmes and the working conditions for staff. This 'ultimate' perspective involves aspects of the 'exosystem' Bronfenbrenner identified in his theory of human ecology.

Katz (1994) suggests that evaluation of the characteristics in the day care environment will require a list of criteria, which can be identified from the various perspectives described above. For example, using the top-down perspective, criterion such as 'adult-child ratio' can be assessed, e.g., 1:5, 1:10 or 2:25, depending on the age group of children. Similarly, from the bottom-up perspective, the criterion, 'child's task involvement' may be assessed by recording the frequency of involvement tasks. Setting criteria and standards allow for more objective ways of assessing the effectiveness of a programme but criteria and standards will vary from one country to another.

However, Katz recognised that there are complications to using multiple perspectives as those with different perspective may look at the effectiveness of the day care environment in different ways. For example, those who use the top-down perspective may be satisfied with the programme but may not satisfy children and parents from the bottom-up and inside-outside perspectives respectively. It is possible that the structural features of a centre such as a good adult-child ratio, adequate space and facilities with the most efficient health and safety regulations, do not guarantee that children will be happy and intellectually challenged nor that parents will feel valued. On the other hand, from the top-down perspective, 'regulatable' programme standards may not be acceptable but the children participating in the programme may be satisfied with the experience.

It appears that using Katz's multiple perspectives approach calls for flexibility in defining criteria and negotiation concerning which perspective should be given priority. This in turn is related to the values of people involved in decision-making and perhaps who holds the power to make these decisions. Using Bronfennbrenner's terms, it does imply that the direction of degree of power and values in this decision making process can begin from the exosystem to the microsystem. There can be a top-down influence on shaping the day care environment of the child. However, the 'spheres of influence' is also described by Bronfennbrenner as interactional and a bottom-up influence should be taken into account on the basis of the everyday experiences of children in the day care environment.

This leads to a more philosophical stance that looks at 'quality' in terms of its reflection of social values. This can best be appreciated and understood by people who are involved in day care provision in one way or another. According to Moss (1994), 'quality' is a

"relative concept, not an objective reality" (p.1) and definitions of 'quality' day care will vary across social groups and across different generations.

Weiss (1995) suggests an approach to understanding 'quality' day care from the user's point of view, that is, the degree of user's satisfaction. She suggests that in attempting to achieve quality in day care provisions, one has to look at the user's expectations of the service. These are Katz's third and fourth perspectives. This suggests that the task of setting 'quality' goals falls upon people who have a stake in this provision and will reflect what they expect given their own experiences, which needless to say, is subjective.

Similarly, Moss (1994) refers to all people who are affected by day care service as 'stakeholders' and argues that defining quality will involve many groups of people setting goals for programmes. These stakeholders can be children, parents, family, employers, providers and society, all of whom can benefit from quality service. However, what makes up quality depends on which group of 'stakeholders' are given the opportunity to set goals. This implies that defining quality is likely to involve an interplay of priorities and rights among 'stakeholders' and it is relative to their needs.

The term 'rights' is used by Melhuish (1991b) who suggests looking at quality in terms of 'rights' for the people who are affected by day care services. In setting quality programmes for children, they have the right to an environment that will not only enhance their development physically, emotionally, socially and intellectually, but also they have a right to an environment which respects individual differences in ethnicity, religion, abilities etc. In the same way, quality can also be explained in terms of parental rights, as

they have a right to be able to decide on the nature of their child's care environment. The child care workers' rights are also considered when examining quality programmes. Staff in day care have the right to a conducive and motivating working environment which will positively influence their relationship with children and parents in the centre.

It appears that this way of defining 'quality' in day care focuses on the qualitative nature of the term with consideration of 'values', 'priorities', 'rights' and 'social-cultural settings' as the initial task. This approach is referred to as the 'inclusionary paradigm' by Moss and Pence (1994). However, agreement on 'quality' day care within paradigm is difficult because it is relative, as the same day care provision can be approved by one user and another user may be dissatisfied with it. In practice, this makes it difficult for providers and licensors of day care to work towards clearly defined goals and for assessment and improvement.

There have been attempts to bring various perspectives of 'quality' into a combined framework. Woodhead (1996) argued that the definition of 'quality' is not a 'once-and-for-all process. He emphasised that it is important for stakeholders to be aware of the diversity of personal, cultural, institutional and hierarchical constraints various perspectives adopted. Woodhead's framework for examining 'quality' accommodates this diversity. In his framework, he describes who stakeholders are, who the beneficiaries from 'quality' are and what the indicators of 'quality' day care are taken to be. These three dimensions are represented on a three dimensional visual cube that links programme and society together.

Munton, Mooney and Rowland (1995) also argue that attempting to find a single and universal definition of 'quality' is fruitless and has no practical value. There are always multiple perspectives and definitions of 'quality' and they differ within and between different groups of stakeholders. Munton et al (1995) suggest a universal framework which clarifies the principles and terms in the debate. In this framework, various perspectives of 'quality' can be deconstructed in attempts to understand, assess and measure the 'quality' of day care. This universal framework combines Donabedian's (1980) three dimensions of 'quality' with Maxwell's (1984) six ways of defining 'quality' in health care provisions.

This combined framework enables various 'stakeholders' to identify the components found in the 'structure' of the day care (e.g. teaching materials, environmental safety, expenditure, opening hours). It also helps identify the processes within the day care (e.g. stimulation of children, parent-staff interactions, child-staff ratio, links between day care and local schools) and the outcome of what is offered by the day care (e.g. language/cognitive developmental optimums achieved, comparable cost of child care, safety and equal opportunities for all children). Munton's conceptual framework also allows stakeholders to ask questions as to whether the day care is effective, acceptable, efficient, accessible, equal or relevant to parties involved. Given this universal framework, researchers and evaluators can deconstruct the concept of 'quality' according to their perspective and clarify their positions using a common vocabulary.

The advantage of Munton's framework is that it enables different groups of 'stakeholders' to identify features of the day care environment and place these features in relation to how

they can be viewed by other groups involved in providing day care. So, when reviewing the findings of such evaluative studies, this model helps place various research conclusions in perspective of other points of view. The framework has a practical value in that it also gives a structure as to what questions can be asked about the features and how they can be assessed. Nonetheless, Munton does not take his framework forward by suggesting a way in which some general agreement can found amongst various 'stakeholders' . Such an agreement might include a common set of day care features that may be considered 'important' if they were found to lead to positive child outcomes. This agreement can possibly indicate a more objective judgement of what 'quality' day care may be.

In applying Munton's framework to the current study, the criteria of 'effectiveness' of the day care environment is the main focus. In this study, features of the day care environment will be identified from professionals and the educators' point of view. Identifying these components will involve the educative structure and processes in the environment and the 'effectiveness' of the day care will be reflected in positive child developmental outcomes.

1.6.2 Measuring 'quality' and characteristics of the day care environment

The goal in this study, is to investigate effectiveness by identifying features or characteristics in the day care environment that can be measured and associated with children's later development. In this kind of analysis, certain antecedents are identified and then tested for their association with positive or negative outcomes. Some might be tempted to say the antecedents which lead to positive outcomes should be considered 'quality' indicators. However, this study takes the more cautious approach in concluding

any day care features found to be associated with positive child outcomes cannot define 'quality' because final judgements on this entail values.

Scores of research studies have identified features of the day care environment that either enhance or impede child development. Howes, Phillips and Whitebook (1992) identified two groups of features in the day care environment, 'structural' and 'process' features, which are used to evaluate the effectiveness of centre-based child care in the USA. The 'structural' variables are features that can be regulated like adult-child ratios, group size and training of teachers. The 'process' variables like teacher behaviour and provision of activities for children are more difficult to regulate through law or institutional guidelines.

Howes et al (1992) used 'thresholds' to measure the effectiveness of day care environment, which means "the point between child care that harms children or hinders their development and child care that does not create detectable harm" (p. 449). Similarly, Dunn's (1993) study of 30 day care classrooms in north-central Indiana identified 'proximal' and 'distal' features in the day care environment to evaluate the effectiveness of day care provision in enhancing children's social and cognitive development. These features are categorised according to their proximity to children's actual experiences. According to Dunn, 'distal' features describe the experiences that are potentially available to children but do not describe actual experiences. These are broad parameters of the environment like ratio, group size, caregiver characteristics, and global assessment like the Early Childhood Environment Rating Scale (Harms & Clifford, 1980). On the other hand, 'proximal' features describe the more interactive and dynamic aspect of day care. These include caregiver-child interaction and peer interaction. Dunn studied

the effects of these two groups of environmental features by examining how closely they predicted children's development.

It appears that from the above discussion, that the 'thresholds' and 'efficacy' of the day care environment are defined in relation to predicting child outcomes. The authors of these studies are concerned with the effects of day care rather than its 'quality' per se. The position taken in this study is to identify the characteristics of the day care environment, related to positive outcomes in child development. Thus, the effectiveness of the identified day care characteristics will be established via evidence of positive child outcomes.

1.6.3 Summary

This study has taken the more empirical stance in methodology by adopting the approach which defines effectiveness of day care in terms of child outcomes. The term 'quality' is value-loaded and relative and therefore, lends itself to multiple interpretation. This study instead uses the terms 'characteristics' and 'effectiveness' of the day care environment while bearing in mind that the choice of outcomes requires value judgement. It focuses on outcomes of specific characteristics of day care. The term 'quality' in the review that follows will only be used if this is referred to by researchers themselves.

1.7 Research frameworks for studies in day care environment

The limitations of research designed to evaluate the effects of day care is noted by Belsky (1984), especially in between-group designs comparing centre-cared and home-cared children. Although research has found that day care experience has an effect on children's

development, policy implications are limited because results do not indicate specific contextual conditions which can be supportive of development. These contextual conditions are important to practitioners and decision-makers especially those that licensing agencies can regulate to optimise child development.

Despite an extensive variation in contextual conditions in day care centres, there have been attempts in identifying key components common to most day care environment. 'Features' or 'indicators of quality' have often been used in the research literature to describe the characteristics of the day care environment. Often, these characteristics are identified and operationalised in objective research and attempts are made to relate these features with child outcomes. The following section explores some research frameworks that attempt to identify the various components of the day care environment and some attempt to show the relationships between these components and child developmental outcomes.

1.7.1 Harms & Clifford's (1993) framework for assessment of early childhood settings

Harms and Clifford identified key components of educational settings, more specifically for centre-based child care facilities. With reference to figure 1.2, there are two parts to the facility; the administration and care group itself. Administration consists of features that involve personnel (e.g. hiring and training), programme (e.g. resources and communication) and management (e.g. finance, regulatory compliance and recruitment). The child care group consists of structural features which involve the people, space and material and recurring patterns like the schedule, and process features that involve the interactions between children, caregivers and parents.

The advantage of a model such as this is that a comprehensive range of features can be identified within a centre for each group of children. It is useful to categorise these features in structural and interactive dimensions for ease in cross study comparability. However, Harms and Clifford's framework lacks the specification of causal relationships and the directions of influence each feature may have on child outcomes.

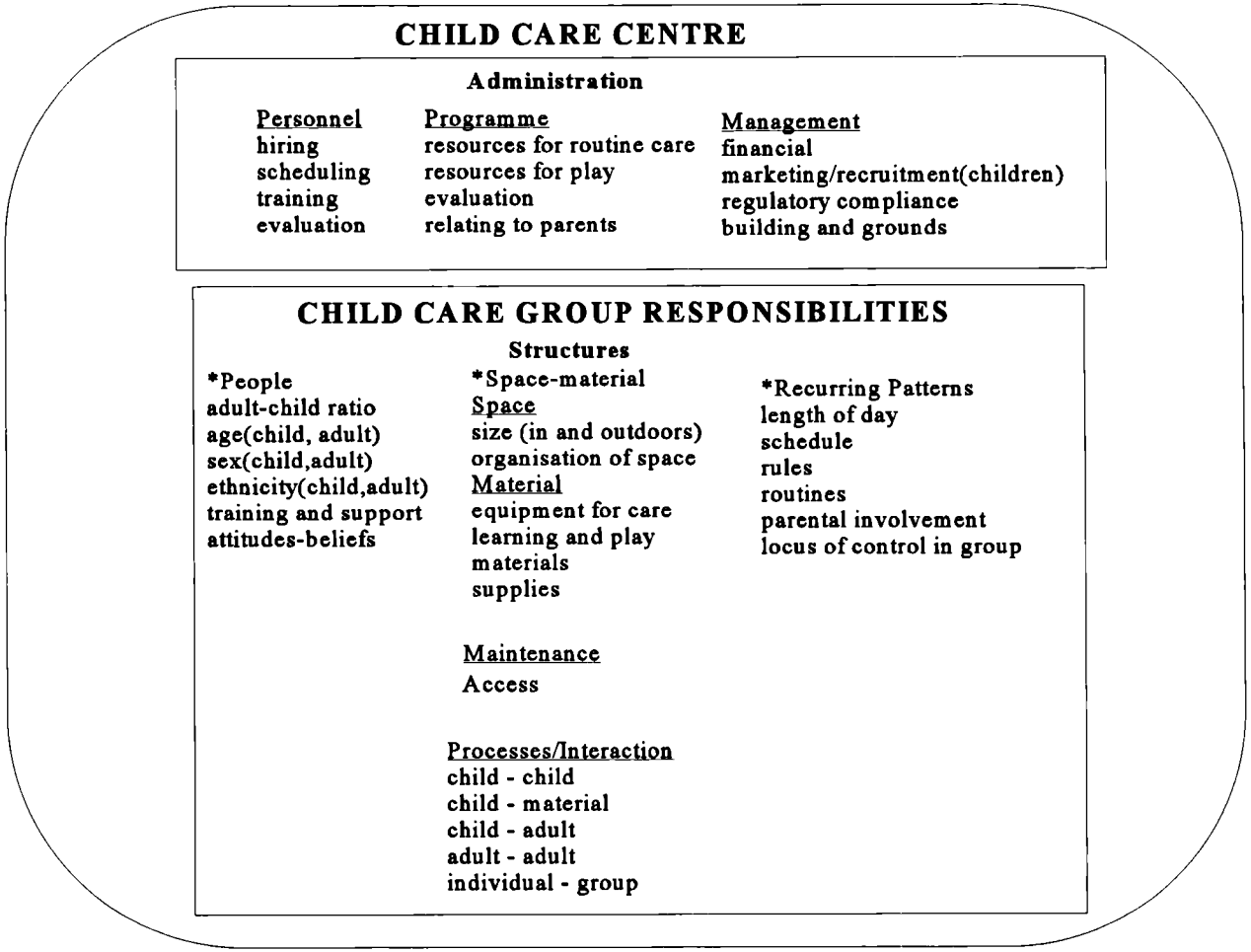


Figure 1.2. Key Components of educational and care setting (Adapted from: Dimensions of Learning Environments; Rossbach, Clifford & Harms, 1991)

1.7.2 Belsky's (1984) causal framework of day care research

Belsky attempted to identify the causal relationships between features found in the day care environment and children's subsequent development. He listed three approaches which researchers can take to present a more holistic picture of the interrelationships of aspects in the day care environment conducive to development. One approach involves looking at regulatable dimensions of day care, what is referred to as 'social structural' parameters of day care. In order to specify how these social structures influence child outcomes, a second approach can be adopted to examine the types of experiences a child is immersed in from day to day. These experiences, sometimes known as interactive variables, can include adult-child interaction, peer interaction and activity level. Belsky proposed the assumption that social structure can influence the type of experiences provided at the centres. In other words, this second approach identifies the experiential consequences of the social structure. The third approach is to attempt to relate these experiential consequences to child outcomes which may give a more informative picture of the conditions of the day care environment. Figure 1.3 illustrates this causal model.

Figure 1.3. Belsky's (1984) causal model of day care research.

Although Belsky's model for day care research gives an organised picture of the possible causal relationships between the variables, it appears to assume the existence of linear relationships among aspects of the day care environment. The framework lacks the recognition that inter-relationships may exist among the variables. Doherty (1991) adapted a framework for examining features of the day care environment from The National Child Care Staffing Study by Whitebook, Howes and Phillips (1989), that has expanded on some of Belsky's categories and included the possible interrelationships among the environmental variables.

1.7.3 Research framework adapted by Doherty (1991) from the National Child Care Staffing Study (Whitebook et al, 1989)

With reference to figure 1.4, Doherty listed seven categories that contain features of the day care environment. These categories are contextual factors, child environment, adult work environment, caregiver characteristics, caregiver-child interaction, child's well-being and caregiver turnover. Some of these categories relate directly and some relate indirectly to child outcomes. An example of direct relationship can be features in the child environment affecting caregiver-child interaction. More specifically, it is possible that caregiver-child ratio can influence the amount and type of verbal exchange between staff and child. Indirectly, the features of the child environment can influence the child's well-being through caregiver-child interaction. For example, caregiver-child ratio can be related to the amount and type of verbal exchange between staff and child which in turn can affect the child's communication skills.

This model also included the more distal features of the day care environment such as the

contextual factors (e.g. parent involvement, funding, administrative authorities) and adult work environment (wages, working conditions, job satisfaction) that can affect the child environment and possibly set off a chain of causal links to child outcome. This framework is to be applauded for taking into account the multi-dimensional nature of the environment, its possible interrelationships, and its subsequent impact on child development.

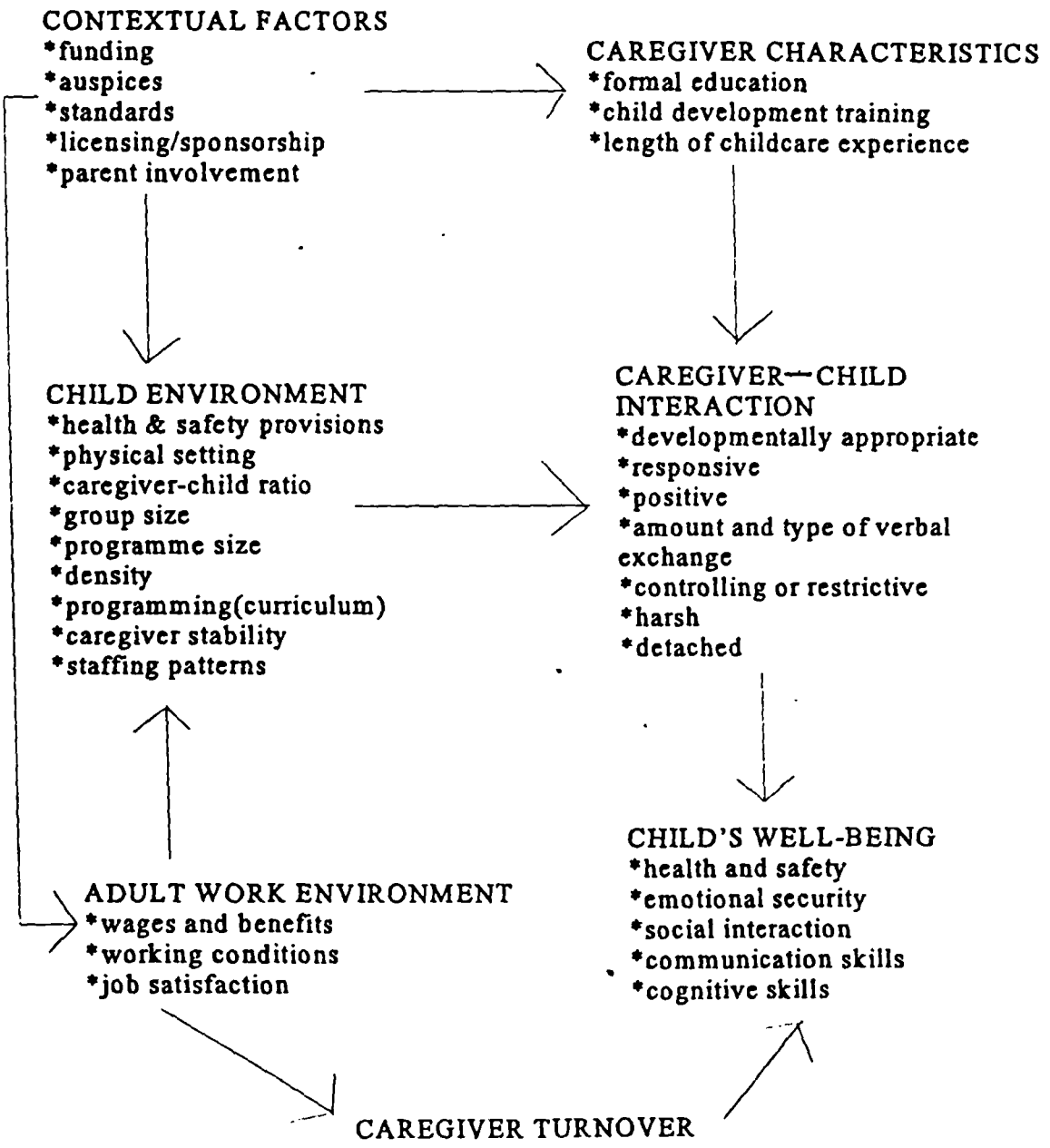


Figure 1.4. Doherty's (1991) framework for examining environmental variables in day care. An adaptation from the National Child Care Staffing Study (Whitebook et al, 1989)

1.7.4 Melhuish's (1993) integrative framework of day care research

The research frameworks discussed so far concern aspects of the day care setting for children. However, examining the effects of day care features on children cannot be isolated from the effects of family features. Bronfenbrenner (1979a, 1979b) first proposed that examining human development requires consideration of the ecological system. The interrelationships between elements within the 'microsystem' and between 'mesosystem' may have an impact on children's development and their experiences in families and day care settings. For example, Lero (1982) recognised the transactional nature of use of day care and its effects on parents' and children's experiences. She suggested that the choice of child care arrangement can be both a dependent and an independent factor. As an independent factor it can affect the children's daily experiences and parents' relationship with each other and to their children. Choice of child care arrangements is also dependent on parents' relationship to their work.

Katz (1993) has also argued for the recognition that the nature of the home environment is likely to influence the level of stimulus at a day care environment. For example, for a child whose home environment is resourced with play equipment, frequent field trips, reading material, television, may find the day care programme boring and lacking stimulus. On the other hand, for a child whose home lacked all the above stimulus, the same day care programme can be challenging and stimulating and enhance development.

Although Melhuish's (1993) research framework, did not delineate all the features found in the day care environment, it adopts a more ecological stance in investigating the effects of the day care environment. His framework includes the home environment and its

relationship with the day care environment. This relationship is represented in figure 1.5 and explains how this can influence the development of the child.

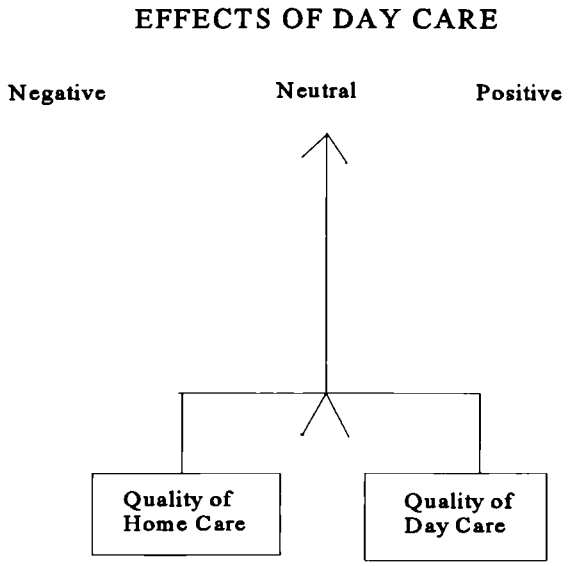


Figure 1.5. Melhuish's (1993) model of day care research

According to the figure , the 'quality' of home care and day care rest on a fulcrum, so, when home and day care is equal in 'quality', there will be no additional effects of day care on child development. This is represented by the arrow indicating neutral. However, if the 'quality' of day care outweighs the 'quality' of care given at home, the arrow will point to positive, indicating the benefits of the day care environment. In contrast, if a child experiences 'high quality' care at home where this outweighs the 'quality' of care at centres, then the effects of day care will be negative on the child. With this framework,

Melhuish argues that it is possible that the same day care may have different effect on different groups of children depending on the type of home environment from which they come.

1.7.5 Summary of research frameworks

The research frameworks discussed so far identify features of the day care environment (Harms & Clifford, 1993), show possible relationships between these features and child outcomes (Belsky, 1984; Doherty, 1991) and include other areas of influence like the home environment in relation to the day care environment on child development (Melhuish, 1993).

1.8 Research framework for Singapore study

The focus of the present study was to examine the effects of the day care environment in shaping children's linguistic and social-emotional development. This was investigated in relation to the possible effects of the family environment on child development. The study attempted to answer the following broad research questions; its research framework is illustrated in figure 1.6.

1. Are there environmental differences in day care centres in Singapore?
2. What are the effects of variation in the characteristics of day care environment on children's linguistic progress and social-emotional behaviour over one school year after taking family background into account?
3. What are the interactive experiences in the day care environment that makes a difference in children's linguistic progress and social-emotional behaviour over one school year after taking family background into account?

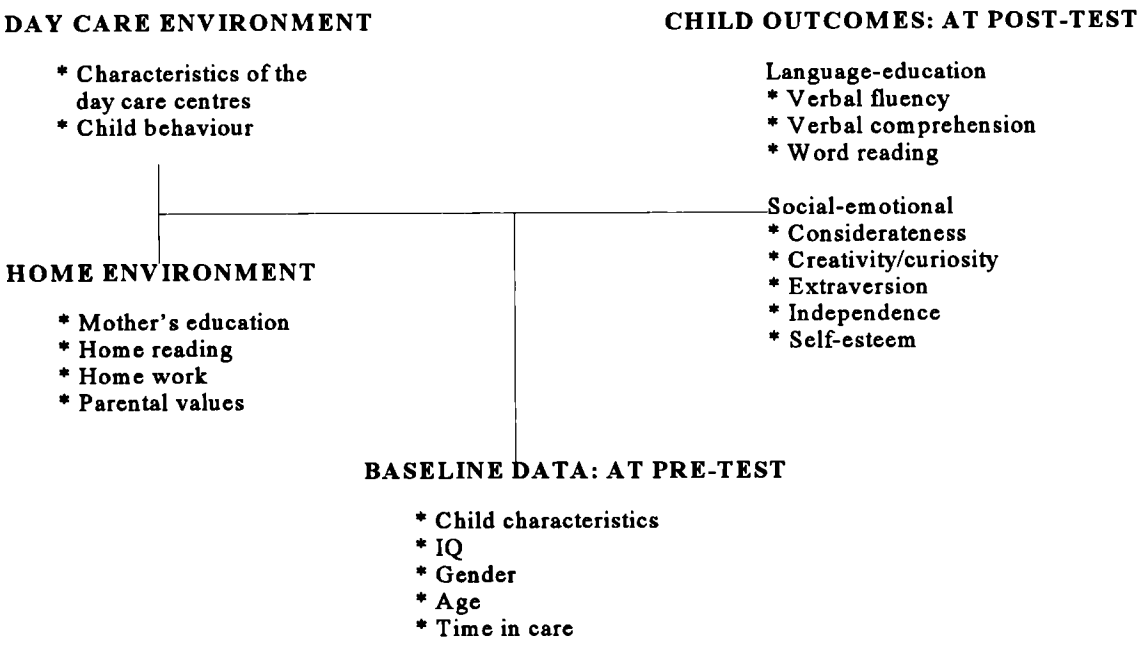


Figure 1.6. Research framework for Singapore study

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction: Empirical research on the effects of day care experience

In the first half of this century, day care centres and creches were set up for children whose families were in need of child support or for impoverished single mothers who needed care for their children while they went out to work. It was seen mainly as a service for the disadvantaged and was custodial in approach.

In the 1960's early childhood provision for young children began to change. This change may be explained by two major influences. One influence was from major philosophers of education and human development like Froebel, Montessori, Dewey, Piaget, (Morrison, 1995) who emphasised the importance of the early years as foundation years of intellectual development for young children. They stressed that education for pre-schoolers should be child-centred and directed towards optimising their potential. Early years education began to be seen as a potential tool for helping children, especially from disadvantaged backgrounds, to get a good start in school.

The other influence was due to social changes in the 1970s. This era saw more women opting to work either in order to contribute to the family income or for personal ambition. A need for out-of-home care for children to support working mothers from a broad range of social backgrounds caused an increase in enrolment of children in day care. Soon not only was day care seen as an intervention programme but it is now viewed as a form of social support for working parents from all backgrounds. Needless to say, these changes caused growing concern for children spending substantial amount of time out-of-home and

being cared by non-parents and in groups.

There has been substantial research since the 1970s, aimed at investigating the effects of day care attendance on children's development. The early research questions relate to comparing home -cared children with day care children in terms of their cognitive and social-emotional development. However, early research had limitations in generalisation of findings due to methodological constraints. Some research involved only university-based, well-resourced, cognitively oriented programmes that specifically catered to children who were classified as disadvantaged (Burchinal, Lee & Ramey, 1989; Bryant, Burchinal, Lau & Sparling, 1994; Weikart & Schweinhart, 1991, Larsen & Robinson, 1989). Therefore, the findings cannot apply to ordinary day care environment.

Random assignment has been difficult in day care effects research due to limited resources and most studies relied on natural assignment of children. Thus, a limitation that emerged was that some studies failed to consider the effects of the home environment such as maternal education, parental values and amount of stimulation which have later been found to relate to children's development (McCartney, 1984, Kontos, 1991, Melhuish, Lloyd, Martin & Mooney, 1990a; Lamb, Hwang, Broberg & Bookstein, 1988). It was also difficult to conclude whether differences in development between home-cared and centre-cared children were due to the type of care examined as it was possible that there already existed differences between the two groups before any type of care was experienced.

Attempts have been made to rectify these limitations by use of 'value-added' research

designs (Plewis, 1985) in which baseline data of children's development (such as pre-test scores) are obtained at the beginning of a study to maintain some comparability. Moreover, random assignment has been attempted by some researchers like Burchinal, Lee & Ramey (1989) and Haskins (1985). In their research, mothers did not choose to put their children into the intervention group, the children were assigned to day care groups randomly and by chance. Therefore, this made it possible to infer with greater confidence that any differences in outcomes between the groups were not due to centre selection bias.

According to Belsky (1984), there have been two 'waves' of day care research over the past three decades. This first 'wave' involved the effects of day care attendance on children's cognitive and social-emotional outcomes, and the second 'wave' of research concerned the characteristics of the day care environment and their effects on children's outcomes. It can also be argued that, influenced by attempts to refine methodological shortcomings described above, a third 'wave' emerged from the first two. This relates to the recognition that there is a need for a broader conceptualisation of day care research which involves an ecological perspective. Relationships between family environment and day care environment are likely (Bronfennbrenner, 1979; Lero, 1982; Glossop, 1982; Sameroff, 1987; Clarke-Stewart, 1987a; Melhuish, 1993) and it is possible that they intervene in the effects of day care on children's development. This third 'wave' attempts to include these variables in large or small scale research (Vandell & Corasaniti, 1990; Dunn, 1993; Vandell, Henderson & Wilson, 1982; Kontos, 1991; Lamb, Hwang, Broberg & Bookstein, 1988).

The following sections review empirical research that looked into the effects of day care in the three 'waves' described above. This begins by exploring research that are concerned with the effects of day care per se, (i.e., care of any kind) for disadvantaged children and low risk children. Studies that examined specific features and the condition of the day care environment and its effects on children's development are reviewed next. This is followed by exploring research that investigated the effects of the family background and its relationship with day care effects.

2.2 The effects of early years education per se

The central research question posed by studies of this design is whether non-parental care and education outside the home is positive or negative to children's development. These studies involve between-group comparisons and also include investigations into the effects of different forms of non-parental care on children's development. The effectiveness of day care is seen by significant positive gains in children's measured outcomes. However, not all studies have obtained positive effects, some found negative ones and some established no effects. Most research of this design involve early education intervention programmes for disadvantaged children. As most of these interventions are half-day programmes and a few which are full-day, the following review examines the effects of both types for the disadvantaged children. This is then followed by examining research that involved low risk children.

2.2.1 The effects of early years education for disadvantaged children

Findings that involved children from disadvantaged backgrounds (that is, from low-income families) showed consistency in establishing effectiveness in bringing about developmental

gains (Belsky and Steinberg, 1978; Ramey, Dorval & Baker-Ward, 1983; Burchinal, Lee & Ramey, 1989; Lazar & Darlington, 1980). Some research showed effects lasting two years (Lee, Schnur & Brooks-Gunn, 1988; Lee, Brooks-Gunn, Schnur & Liaw, 1990; 1990) from the start of intervention and some showed more impressive long-term effects (Schweinhart, Barnes, Weikart, Barnett & Epstein, 1993) lasting 27 years.

2.2.1.1. Effects on cognitive/language development on disadvantaged children

Immediate and positive gains in cognitive functioning of children who attended pre-school have been generally found in studies. These findings were stronger for children who were from disadvantaged home background than low risk children. Such studies have reported short-term effects on intellectual competence assessed by standardised IQ measures and longer term effects were obtained on cognitive functioning that related to school skills.

A longitudinal study which started as the Perry Pre-school Project in 1962 now known as the High Scope Programme (Berrueta-Clement, Schweinhart & Weikart, 1983; Schweinhart, Barnes, Weikart, Barnett & Epstein, 1993; Schweinhart & Weikart, 1980; Schweinhart et al, 1985) aimed to determine how early education can benefit children at risk of failing at school. The programme, cognitively rich and 'lightly structured' (Weikart, Rogers, Adcock & McClelland, 1971), attempted to prevent school withdrawal and delinquency among children from low income families. Based in Ypsilanti, Michigan, the study followed through five groups of 25 children at three or four years old through to age 27. Random assignment of children to one of the two groups, either with or without pre-school attendance, was conducted in this study and this allowed more confidence in making inferences about the intervention effects. In making comparisons

between the two groups, the study found immediate gains (15 points) in intellectual performance among the children who attended pre-school during their first year but children who did not attend pre-school had a lower gain of 4 points. However, this was only short-term since there was no longer a difference between the groups by the end of their third grade. It can be that the standardised intelligence assessments captured the overall cognitive level of the children but was not sensitive enough to capture the progress in specific cognitive skills required for school.

Evidence was shown on school achievement assessments where the group difference favoured the programme attendees. Results on reading, language and arithmetic assessment showed that this group difference remained longer and constant through to eighth grade but disappeared after. Therefore, gains in cognitive functioning were found on intellectual performance and academic development for children who attended an early education programme at least through to the third and eighth grade respectively.

Other measures of cognitive functioning showed even marked long lasting evidence of the success of the High/Scope Pre-school programme. Results continued to show that by age 19, significantly more pre-school experienced children graduated from high school, had a college or vocational training and they spent less time in special education compared with children who did not attend pre-school.

Evidence of developmental gains were also found among the Head Start pre-schools (McKey, Condelli, Canson, Barrett, McConkey & Plantz, 1985) in the U.S.A. but these gains were not as long lasting as the High Scope Pre-school Programme. Like the High

Scope, Head Start's aim was also to help children from disadvantaged environment, for example, low income and ethnic minority groups. A synthesis of 210 documents relating to research on the effects of Head Start programme was conducted by McKey et al (1985) in which a meta-analysis was used. Effect sizes of a variety of research designs were used to make fair comparisons and averaged across the studies. General results showed that there were differences in achievement and school readiness after one year and this favoured the Head Start children. However, differences were not found at the end of the second year for all cognitive outcomes. Although, based on a few studies, the meta-analysis also indicated that children from Head Start were less likely to fail a grade in school and be assigned to special education classes.

It is difficult to be firm about conclusions in meta-analysis because the studies chosen in the synthesis project varied in design and some did not control for initial differences between groups of children. However, the use of effect sizes suggested a general trend of positive effects of the Head Start programme.

Like the synthesis of Head Start projects by McKey et al (1985), there was also an attempt to analyse a combination of pre-school intervention studies to establish a general finding of their effectiveness. The Consortium of Longitudinal Studies (Lazar & Darlington, 1980) conducted a meta-analysis of six invention projects that followed up low income children, some till they were nine years old and some till 19 years of age. The team found that pre-school attendees from disadvantaged backgrounds had higher gains in cognitive progress compared with the children who did not attend any pre-schools. The consortium also reported that children who had pre-school experience were less likely to

be assigned to special education classes.

Although not as statistically significant, they also established that there was an 'average' effect across the projects where pre-school experience reduced the incidence of retention in grade. Underachievement was also measured and indicated that children who attended pre-school were significantly less likely to be classified as underachievers in later school years. With achievement measures, the consortium found that children in the experimental group scored higher than the control children on mathematics achievement but verbal achievement showed only a suggestive trend in the same direction.

Lee, Brooks-Gunn and Schnur's (1988) investigation into the effectiveness of the Head Start programme used a different research design to see how it compared with other early education programmes. The study compared not only disadvantaged children attending Head Start with no pre-school experience children and but also with children from other pre-school programmes. Their design included pre-assessments of children initial development which were adjusted in their covariance analyses of data so that comparison of development was more fair. Post assessments nine months later were conducted on children's receptive vocabulary, intelligence and ability to reason and categorise.

The results again established that Head Start programme children had an advantage over the other two comparison groups, however, significant results were not found among the 'white students'. In comparing Head Start with the no pre-school experience group for 'black students', it was found that the intervention programme had a significant and positive effect on mental processing like categorisation and reasoning assessments. When

Head Start was compared with children from other pre-school programmes, again, the intervention programme had significant effects on receptive language and intelligence but not the other tasks. It appeared that the findings indicated a one-year gain in cognitive functioning of disadvantaged children, especially the 'black children', in attending Head Start pre-school programme. It can be argued that 'black children' entering the Head Start programme were more disadvantaged than the 'white children' and were benefitting most from the intervention.

In a follow-up of their study at end of kindergarten and grade 1 (Lee, Brooks-Gunn, Schnur & Liaw, 1990), the findings again favoured the Head Start programme for disadvantaged 'black children'. However, the effects were found to be moderate only especially found on perceptual reasoning and verbal achievement. Lee cited some reasons for this lessened effect. It may be the case that poor minority children were likely to be treated less favourable in school thus limiting their learning experiences. So a one-year intervention may not be strong enough to take away an accumulation of disadvantages for these children and therefore sustained gains achieved during the intervention could have been undone.

Besides half-day programmes like Head Start and High Scope, other studies have examined the effects of full-day care experience on development of disadvantaged children. The effects of centre day care on socially disadvantaged children were investigated by Ramey, Dorval & Baker-Ward (1983). This sample of children came from the Abecedarian Project which had similar aims to that of Head Start and Perry Pre-school in that it hoped to compensate for children from disadvantaged backgrounds in

North Carolina, U.S.A. In this project, random assignment of 54 children to either the experimental group (the day care group) or the control group (children who stayed at home) was achieved. Intellectual assessments were carried out at intervals of once a year from 12 months of age until 60 months. There were no differences found at 12 months but the groups differed significantly after this first assessment. Day care children at 42 months were found to be better in verbal, perceptual, quantitative and memory skills than the children at home and at 54 months, differences were sustained except for development of memory skills. This study showed that not only can an intervention programme enhance disadvantaged children's cognitive and linguistic ability but also a full-day care programme can free both parents to work or get further education. Both opportunities are essential in overcoming problems associated with low income.

So far, studies cited involved programmes specially designed to improve the development of disadvantaged children. Therefore, children were given cognitively rich and stimulating curriculum to follow and needless to say, there should be evidence of progress compared to children deprived of this experience. In reality, not all children are able to be enrolled in these interventions due to limitations set by social policies (e.g., only children from impoverished background were eligible).Therefore, community-based centre care may be the next option for parents in need of support.

The effects of community-based programme was included in an investigation by Burchinal, Lee & Ramey (1989). A sample of 131 disadvantaged children were recruited from the Abecedarian Project, later known as the CARE project and were randomly assigned to three types of day care experience. One group of children was assigned to the

intervention group and received a university-based day care centre with a programme designed specifically to enhance children's thinking. The second group of children (community) was assigned to a high 'quality' community-based day care centre certified by the state as having met all the stringent standards set. The last group of children (minimal) had no experience in any of the programmes.

The researchers tightened their analyses by adjusting for maternal IQ, mother's education, marital status and quality of the home to prevent any selection bias. Their results showed that at the end of two years, children from the intervention group scored higher in cognitive scores than the community group and the community group scored higher than the minimal group. This may indicate that not only was the university-based experience most successful in alleviating under achievement but also experience in high 'quality' community-based day care could enhance cognitive development among children from lower social economic background.

From the studies cited above, compensatory early educational programmes were shown to be beneficial to the cognitive development of disadvantaged children. Short-term effects were established where assessments that involved general intellectual ability were used but longer term effects were seen in cognitive abilities related to school skills and practice (Schweinhart & Weikart, 1980; McKey et al, 1985). Moreover, lasting effects into adulthood have been found. This positive effect was not only restricted to half day programmes specially designed to enhance cognitive functioning in children but also in other types of pre-school programmes (Lee et al, 1988, 1990) and high 'quality' community-based full-day care programmes (Burchinal, Lee & Ramey, 1989).

2.2.1.2 Effects on social-emotional development on disadvantaged children

Results from studies on the effects of attending pre-school on social development for disadvantaged children were also consistent with that of cognitive development. Some studies reported sustained positive effects till start of school and some till adulthood.

In Ramey, Dorval & Baker-Ward's (1983) study of 54 disadvantaged children from the Abecedarian Project, the researchers reported that children who attended day care centres were more socially confident and goal-directed than the children reared at home at 18 months. They also found that the centre-cared children were more interested in peers and were just as friendly and co-operative as their middle-class peers. However, it must be noted that for these analyses, a t-test was only used to obtain results and this did not consider other background factors like mother's education that may covary with day care group. One example is that it was established in this Abecedarian Project, that mothers of day care children had significantly more education by the time their children were 54 months old compared to mothers whose children were at home. This meant that day care mothers had more time to continue their education and this led to their being in semiskilled or skilled jobs. The change in mother's status may have created a more stimulating home environment for children and this may have confounded the effects of the day care group.

Head Start children were also followed through for social-emotional development in some studies. Lee, Brooks-Gunn, Schnur and Liaw's (1990) study followed 969 disadvantaged children through to grade one. They compared Head Start children with either no pre-

school or other programme, and measured social competence as reflected in communication, interpersonal relations, frustration and help seeking behaviour. In their covariance analyses that adjusted for initial differences, they found that Head Start participation had a significant positive effect on children's social competency when compared with children from the other two comparison groups. However, the effects of Head Start were more dominant when compared with control children than pre-school children from other programmes. This can possibly indicate that for the most disadvantaged children, the 'black children' in this study, other pre-school programmes besides Head Start can have beneficial effects on their development.

Longer term effects on social-emotional development were found in the Consortium of Longitudinal Studies (Lazar et al, 1980) in which the team explored the question of whether intervention pre-school programmes had influenced children' attitudes, values and self-esteem which were skills considered necessary for school achievement. They found that social-emotional skills enhanced by pre-school intervention programmes were supportive of development in cognitive skills essential for school success.

An evidence of social support was found in mother's aspiration for their children which could have helped sustain interest for their children. Lazar and his team, in their meta-analysis, found that among mothers whose children were in a pre-school programme had higher job aspirations for their children than those whose children were not in a pre-school programme. The researchers attributed this to the initial gains that children made during and after the pre-school programmes that caused the mothers to change their attitude and expectations. A transactional relationship (Sameroff, 1987; McCartney & Black, 1995)

appeared to have existed in that short-term positive gains in children changed mother's attitudes that made a positive impact on children's motivation and orientation to achieve.

The Consortium further established that children with pre-school experience were more likely, when asked what they have done to make them feel proud of, to give achievement related reasons such as school or work achievement. A self-evaluation of how 'good' children were compared to their friends established that the pre-school children rated themselves better students than did control children. Although the difference was small, the results obtained were significant. However, when examining sociability and social participation, the Consortium found no differences between the two groups. This did not mean that children with pre-school experience fell behind the control children, it just indicated that both groups did as well as each other in sociability.

It is interesting to note that motivation, positive self-concept and higher aspirations were attitudes developed through immediate gains in school achievement and continued to have an upward spiralling effect on the development of disadvantaged children. Evidence of this beneficial effect in adulthood was reported by the High Scope Project (Berrueta-Clement et al, 1984). At age 19, more children who attended the High Scope Project were employed and scored higher on the Adult Performance Level survey than no pre-school experience children. This survey measured a person's competence in solving real work problems and coping with adult life. In addition, the project found that children who had no experience in pre-school had more occurrences of being detained or arrested by authorities. There were also more teen pregnancies among the females in the group with no pre-school experience.

Even more impressive long term results were reported for these children at age 27 (Schweinhart, Barnes, Weikart, Barnett & Epstein, 1993). The High Scope team reported that significantly more programme graduates had high school grades, earned more than U.S.$2000 a month and owned a house and appeared to have better quality of life at adulthood. Specifically, females pre-school attendees had significantly more monthly earnings because more of them found jobs and for the males, they had significantly better earnings because they found better paying jobs. Also for the females who attended the High Scope programme, less time was spent in programmes for educable mental impairment and more of them completed 12th grade and higher. For the program males, fewer of them received social services between age 18 and 27, fewer had five or more lifetime arrests and more owned their own homes at the age of 27.

It seems that where social development was concerned, intervention programmes brought about beneficial effects . More programme attendees were found to be socially confident, goal directed, cooperative and friendlier. Results from projects like the High Scope were even more striking as they showed that interventions helped not only in improving the quality of life for the disadvantaged children but also for the society at large in the long term.

2.2.1.3 Summary of early years education effects on disadvantaged children

In summary, results indicated that having a pre-school experience especially for children from disadvantaged backgrounds, is a beneficial experience. Some studies found short term gains in intellectual performance among children with pre-school attendance compared with those who did not get the pre-school experience. It should be noted that

this short term effect could be due to many other factors such as lack of home help and lack of motivation. However, it is also important to note that in many of these studies, intellectual development was measured by standardised IQ test. Studies that used other assessment of intelligence, especially the ones that relate more to day-to-day school experiences, for example, school grades and special education attendance showed more sustained effects. Some lasting till the first year of school and some till adulthood (Lazar et al, 1980; Schweinhart et al, 1993).

Similarly, with social development, it appeared that results were positive for children who experienced early education. Achievement motivation and self-esteem with higher maternal aspirations and expectations were found to be associated with having pre-school experience. This was shown to lead to a better 'quality' of life at adulthood. Table 2.1 shows a summary of the findings on the effects of early education for disadvantaged children.

Table 2.1

Summary of the Effects of Early Education Programmes for Disadvantaged Children

	Cognitive / Language Development		Social-emotional Development	
Programme	Programme Effects	Time Span	Programme Effects	Time Span
High Scope (Schweinhart et al, 1985, 1993; Schweinhart & Weikart, 1980, 1997; Berrueta-Clement et al, 1983, 1984)	Better intellectual performance Better reading, language and arithmetic skills More high school graduates and less time in special education	Till end 3rd grade Till end 8th grade Till age 19	More employed, more competence in solving work problems, coping with adult life Higher earnings, more own homes, less time spent in educable mental impairment (females), less received social services and less arrests (males)	Till age 19 Till age 27
Head Start (McKey et al, 1985, Lee et al, 1988, 1990)	Better school achievement and readiness Better intellectual competence Less likely to fail a school grade and be assigned to special education	Till end of 1st year Till end 2nd year	Higher self-esteem, achievement motivation and social behaviour More social competence	Till end of Head Start year Till 1st grade
Abecedarian Project (Ramey, Dorval & Baker-Ward, 1983, Burchinal, Lee & Ramey, 1989)	Better verbal, perceptual and quantitative skills Better cognitive skills	From 12 to 54 months Till end of 2 years	More socially confident, more goal directed, more interest in peers, friendly and cooperative	From 6 to 18 months
Consortium of Longitudinal Studies (Lazar & Darlington, 1980)	Higher cognitive gains, less likely to go to special education, less likely to underachieve Higher in mathematics	From 9 to 19 years Till 3rd grade	Mother's aspiration higher, children more achievement oriented, better self-esteem No differences in sociability	From 9 to 19 years

2.2.2 The effects of early years education on lower risk children

Research cited in the following sections examine the effects of attending early education programmes for children who are not disadvantaged socially and economically. Recently, there are more investigations into the effects of full-day programmes than there are for half-day programmes. This is because the effects of full-day attendance in various types of day care on children's development have been a concern among parents and researchers as these children spend a vast amount of time away from home and their parents. Because of this concern most studies compared the development of children cared for by non-parents, mostly in groups with children who are cared for by their mothers at home. Unlike results from the disadvantaged sample, the results with more advantaged children have been inconsistent. Some studies reported positive effects on children's cognitive abilities and social behaviours but others established negative child development. Also, for some research, no differences between children cared for at home by a parent and children cared for outside of the home.

2.2.2.1 Effects on cognitive/language development on lower risk children

Positive results were obtained in a longitudinal study (Larsen & Robinson, 1989) that looked into the effects of a university-based half-day pre-school programme on low-risk children. Random assignment of 125 children to two groups, programme experience and no programme experience, was used and children were followed up through to second and third grade of school. The results showed that for the females at third grade, there was no significant effect on achievement as reflected by reading, language, arithmetic and study skills. However, for the males, a significant group effect was found indicating that males who attended pre-school scored significantly higher specifically on reading

vocabulary, total reading, spelling, total language and the total battery of test than did male non attenders.

The study also found that a greater amount of time was spent with children by mothers of pre-school non-attenders than did mothers of pre-school attenders. This meant that the positive effects of pre-school attendance were greater than parental involvement. The study has also shown that early education can enhance lower risk males especially in language and verbal skills. The possible implication of this finding is that pre-school experiences can reduce gender differences in language development.

However, the findings of this study were limited by the nature of the sample as it was characterised by above average parental education, father's occupation and income. Also, most parents in the sample were Mormon-affiliated, so attitudes towards family and children might be different from those who were not affliated. Caution has to be used also in drawing conclusions from the findings as it is noted that a parent education programme existed along with the pre-school experience. This was not separated from the main analyses and might have confounded the effects of attending centre day care per se.

University-based programmes like the above are specially designed to enhance children's development, most of them are cognitively rich and geared towards promoting positive social growth. Programmes like these are not easily available to the average families and it is important to examine the effects of community-based centre day care programmes that are more available to the masses.

One such study that involved community-based centre care was Rubenstein, Howes & Boyle's (1981) two-year follow study of three and a half year old children of which 13 were home cared and 10 centre cared as infants. Although random assignment was not conducted, the two groups were consistently matched on child characteristics and home background factors. On speech and language development, the results showed that of the three language measures that were used, the groups were significantly different for two of these measures.

It does appear that there were positive effects of centre care for these children but the sample was mainly middle class and therefore this limited generalisation. Also, the study found that the mothers of day care children spoke longer sentences to their children than the mothers of home reared children. Mother's speech was significantly correlated with the two child language measures. Therefore, language differences cannot be attributed to centre care per se because of possible confoundment by home environment reflected by mother's speech. In addition, the follow-up analyses did not take into consideration the differences found at infant stage which could have contributed to the variance of their development two years later.

The existence of possible influence from other sources especially from the family environment can confound effects as shown in studies by Larsen and Robinson (1989) and Rubenstein et al (1981). This evidence of the multi-dimensional nature of children's educational and care environment points to the importance of taking into account intervening variables especially from the home environment such as mother's education and amount of home stimulation. Also, most researches in this area were unable to

randomly assign children and therefore initial differences between groups needed to be taken into account.

The Thomas Coram Research Unit (Melhuish, Mooney, Martin & Lloyd, 1990a) adopted a rigorous design that not only took family background into account but also used initial differences in the children as baseline data in their analyses. Melhuish and his team investigated the effects of attending day nurseries (full-day centre care) and other forms of child care in Britain. These consisted of home children, children looked after by a relative, by a childminder and day nursery children. They assessed children's cognitive and language progress from 5 months to 18 months of age.

The study found a statistically significant relationship between mental development scores at 18 months and day care group membership. However, there were strong associations between parent occupation, income and mother's education and investigations found that mother's education was most strongly associated with progress in outcome scores. Hence, to tighten the analysis, the study controlled for this confoundment from initial differences at 5 months, gender and mother's education in the regression analyses. The results showed that only mother's education was a significant predictor of mental development at 18 months and that the relationship between mental development and day care group was due to both variables having an association with mother's education.

On their assessment of language development (number of separate words and word combinations produced by the children), the same data analysis strategy was used and mother's education did not emerge significant. Instead, word combinations were found

significantly associated with day care groups with nursery children showing higher levels of word combination.

Like the Thomas Coram Research Unit, the effects of a variety of day care arrangements was also studied by Clark-Stewart (1984) on a sample of 150 families. These arrangements followed a continuum of 'quantity of day care' that increased in number of hours of non-parental care, number and variety of children and adults providing care and institutionalisation of physical setting and activities. For example, at one end of this continuum was an only child cared for by parents at home and at the other end were children cared in a group at a day care centre full-time. The children were not randomly assigned and were already found in centre care and home care groups at age two to three years of age.

Their analyses showed positive effects of centre care. On cognitive assessments, which consisted of language comprehension, verbal fluency, knowledge of concepts and memory span, the results indicated that children attending centre care were consistently nine months ahead of the children in home care. Similar findings were also obtained for assessments of social cognition, however, differences disappeared after five years of age. Although children's age and social economic status were considered in their analyses, it is unfortunate that pre-assessments at earlier stages were not taken into account. There could exist differences in children's earlier outcomes not due to being in a day care group and the effects reported might be relative to these initial differences. Therefore progress due to attending centre care might not be 'purely' measured. Also, the interpretation and generalisation of these results was limited to only middle class children.

Like Rubenstein et al (1981) and Melhuish et al (1990a), Clarke-Stewart's study also identified an intervening variable related with home background, that might have confounded the effects established. This was that a quarter of the mothers have worked or were working with young children professionally at the time of study and this could have helped positive child development.

Investigation across a variety of pre-school provisions was conducted by Osborn & Milbank (1987) and their results also showed positive effects of attending an early education programme. This study was large scale and longitudinal and involved 5,413 children with different types of pre-school experience (including centre day care) and 3,719 children without any. An array of assessments were used which consisted of mental and vocabulary tests at age five and vocabulary, reading, mathematics and language skills test at age ten were conducted. The results on these assessments indicated that pre-school experience made a difference to children on language performance at five years of age and intellectual and reading performance at ten years of age. In considering the type of pre-school experience, independent nursery school and playgroup children achieved the highest scores compared with other types of pre-school experiences.

Again shortcomings were found that makes it difficult to be sure of causal relationships in this study. Sample size used at age ten testing was small and there existed a disproportion of numbers between types of provision. Testing was conducted at five years when pre-school had already started and no baseline assessment was used to control for unequal starting points among the children. In addition, most children in day nurseries were found to be from more disadvantaged background compared with playgroup children

coming from middle class families. The authors attempted to adjust for differences statistically but in the absence of baseline measures at age three interpretation of these findings was limited.

In contrast to the studies cited above, negative effects of centre care attendance have also been cited in some studies. Vandell and Corasaniti (1990) found that extensive centre-cared children did poorly on cognitive assessments. In this study, parental recall was used to obtain information about child care history and five categories were created according to degree of care spent away from home. A total of 236 children were selected for this study and assessments were conducted at third grade on various cognitive and social measures. To remove the possibility of selection bias as children were not randomly assigned, the researchers used stepwise regression analyses to control for family SES, family size, marital status, family moves, birth order and gender. The results showed that children with more extensive child care experience, that is, children cared for outside the home since infancy, was associated with poorer grades on reading, language and math. They were also found to perform poorer on the standardised basic achievement test.

The results from Vandell and Corasaniti's study appeared to suggest that children cared for at home were better off than children cared for extensively outside of the home. However, it should also be pointed out that inspite of the tight control of family background variables, the study did not did not assess the degree of stimulation the home children may have received. The relationship between family and child care was not included in the analysis and it was entirely possible that children who did not have extensive centre care had mothers who were available to interact and stimulate child

development.

It should also be noted that Vandell and Corasaniti's study was done in Texas, a state with minimum child care standards. These standards were lower than some other states and communities in the United States and it is therefore important to interpret these results within the context of these lower state requirements. The negative results can mean that lower standard was not good for children and therefore in comparison, children in home care would have performed better. Therefore, investigations should consider the context in which this study was done such as the standards of provision required of a day care centre.

Other researches also point to the importance of looking at the context in which results were obtained. Andersson (1989, 1990) in Sweden investigated the effects of types of care on children's cognitive and social development. This longitudinal study followed 119 children from the age of three and fours years to thirteen years of age. The children were grouped according to the type of care they received, that were, centre care, family day care and mixed care. Parental recall was used to obtain information about these day care arrangements from the children's first year of life. Regression analyses were used to partial out the influence of mother's education, family's occupational status, family type and child's gender. Although results favoured day care children, the effects were not significant. However, age of entry was found a strong predictor of performance on verbal tests and school achievement. This meant that children who entered day care as infants did better than those who entered later.

In another Swedish study, Cochran (1977) compared 60 children who attended Gothenburg's comprehensive child care centres and another 60 children reared in family settings. The family settings were further divided into children who were home with mothers and children who were home with a childminder. All children were fully matched on gender, number of siblings, SES and geographic location of their homes. A comparison of children's experiences and their care environment were assessed and the results of the study did not show significant differences in mental development between care groups at 12, 15 or 18 months. The only difference found was on hearing and speech favouring the home based children.

On both the Swedish studies that obtained no effects, it can be possible that the findings reflect the high 'quality' of Swedish day care. Care of children is a national responsibility and valued by both state and family, therefore, the lack of differential results between home and centre cared reflected consistent high standards of the care environment for children in Sweden. Lower 'quality' care might have led to different results.

In sum, research findings indicated that where cognitive development was concerned, there has been a mixture of effects of day care attendance for low risk children. For the studies cited in this section, it is possible that the mixed results were due to lack of consideration of other contextual factors such as the home environment, state and national regulations. These could have possibly interfered with the effects obtained on cognitive and language development.

2.2.2.2. Effects on social-emotional development on lower risk children

There has also been concern that time spent away from home and in group care may affect children's social-emotional development. Early research in this area involved examining mother-child attachment and findings have initially shown little impairment of the attachment of child to mother. One early example was a study by Blehar (1974), which found that two to three year old home-reared children were more secure than centre-reared children as they were observed to greet their mothers more positively at reunion in the 'strange situation'. This observation was used to suggest that centre-reared children were more insecure emotionally than home-reared children. However, findings from other investigations were mixed and some replications of Blehar's study (Moskowitz, Schwarz & Corsini, 1977; Ragozin, 1980) did not find impaired attachment. This led to suggestions that any anxiety shown by centre cared children on separation with their mother is part of normal development and should not be taken as a sign of poor attachment. It is possible that, in general, children go through a transitional phase of distress which is a period of adaptation for children new to out-of-home care. So it seems that if there are any emotional problems in centre cared children, they may only be short term. As the review of literature in this study is specific to the variables investigated, research in the effects of day care on attachment is not explored. Comprehensive reviews of this focus of research is explored by Belsky (1988), Gamble and Zigler (1986), and Melhuish (in press).

For this study, social competence and interactive aspects of the child's development were investigated and therefore research studies were reviewed with this in mind. Some studies examined anti-social behaviours like aggression and anxiety or pro-social behaviours like

extroversion, independence, cooperation and compliance. Interaction with peers and adults, play and language exchange were also used as indicators of social development. Most of these assessments involved either a teacher/parent rating scale, peer nominations or observations in the care setting or a research laboratory. Results obtained with lower risk children were again mixed, with some studies reporting positive effects of day care and some others finding negative social behaviour or no effects at all.

Positive effects were obtained in the Chicago study by Clarke-Stewart (1987b) who investigated 81 two to three year old children from a variety of child care arrangements. The study made observations of children's social competence that coded the degree of autonomy, social reciprocity with mother, social knowledge, sociability with adult stranger and with an unfamiliar peer, negative behaviour to the peer and social competence at home. Findings indicated that children cared for in centres (nursery or day care centres) scored higher than children cared for in a home (in-home caregivers or family day care homes) on social competence with adult stranger and peer stranger. It was also found that centre cared children were more independent of their mothers.

Clarke-Stewart also found a predictable pattern of association between the forms of care and the competence of children. Children who attended half-day programmes which were educationally oriented, were advanced in cognition and adult-oriented competence. Children who attended a longer session in day care centres were more independent from their mothers and had more social interactions with her. In the case of children who attended family day care, they were less familiar and stayed closer to their mothers but had intimate social interaction with peers and played more cooperatively and comfortably with

unfamiliar children.

Positive effects on cooperative play and interaction with peers were also obtained by some studies. In his Swedish study children under two years of age, Cochran (1977) found differences in social behaviour between those in centre care and those in home care. Observations were made on children's moment-to-moment social behaviours and it was found that exploring behaviours occurred significantly more in child's own home or family day care home settings than centre settings. However, play experiences and peer interaction were more frequently observed in centres. The researcher suggested that these differences in social behaviour were influenced by the environment in that home settings cater to both adults and children, therefore children were free to explore. On the other hand, centres are specifically designed for children and have formalised limits as to where children can go. This inhibits exploring but there are more play opportunities with peers. Confirming Clarke-Stewart's study that suggested a pattern of association between types of care and social competence in children, Cochran also found that different physical settings used for child care encouraged different social behaviours.

Social behaviour was also examined in a study in Italy (Aurelli & Procaci, 1992) that looked at the social participation and linguistic exchanges made by children 38 to 42 months of age in a nursery school. A comparison was made between two groups of children, matched on gender, consisting of 20 children who went to a day care centre for at least two years and 20 children who were reared at home only. Observations were made using an instrument from the Oxford Pre-school Research Project (Sylva, Roy & Painter, 1980) to register child behaviour in the area of social and verbal interaction.

Frequencies were used for comparisons and results indicated that children who went to day care centres participated more in activities with their peers than children who were cared for in the home. Results for verbal interaction also favoured the centre cared children as they were observed to produce more linguistic turns than the home children.

Another study that found positive effects of centre care on cooperative play was by Goelman and Pence (1987). In their Canadian study of 105 child-parent-caregiver triads, a comparison was made between licensed family day care, unlicensed family day care and centre child care on children's social development. Children were carefully matched on birth order, family structure, parent education, occupation and income. Using child observations, the study found that children in unlicensed family day care engaged in more solitary play than children in centre programmes. Children in both types of family day care were also found to show more parallel play than children in child care centres. They found that centre children were more cooperative in their play compared to children in family day care homes. It should be pointed out that children in centre care were older with a mean age of 50.56 months compared to children from licensed and unlicensed family day care (mean age of 38.81 and 39.78 months respectively). As children's age was not taken into account in examining play behaviour, it is not surprising the centre-cared children were more cooperative and social in their play as they were older.

In contrast, some studies have found that children with centre care experience were less compliant, hyperactive, aggressive and anxious. Vandell and Corasaniti (1990) in their comparison of the effects of five types of child care reported these negative social behaviours. The researchers used teacher and peer ratings of children's peer relations,

compliance, work habits and emotional health at third grade. Vandell and Corasaniti found that children in extensive non-parental care were more likely to come from one-parent families and children in part-time care came from highly educated families. With this in mind, these family factors were taken into account in their stepwise regression analyses. The results showed that child outcomes were best predicted by child care history and family factors. It was found that extensive centre care predicted negative teacher and parent ratings of peer relations, work habits and compliance. Extensive centre care was also found to predict fewer positive nominations of sociability from classmates.

It is recalled that this study was set in Texas that required lower standards of provision in day care centres and therefore negative results can be a reflection of less ideal conditions in a care setting and not generalise to better 'quality' care. The results were also based on caregiver's ratings and these could possibly be bias as parents who valued home as an appropriate care environment for their children would rate them as better behaved. Also, if teachers were working in poor conditions in day care centres, their dissatisfaction might have interfered with their ratings of children's social behaviour.

Similar negative results were obtained in Rubenstein, Howes and Boyle's (1981) observations of 15 children cared for in centres as infants and 15 cared for at home. When the children were three and half years old, records of child's compliance and verbal interactions with mothers in a sorting task were observed in their own home. Results showed that children in day care were less compliant and verbally less compliant to their mothers (50%) than were the home-reared children. According to maternal reports, they were also less likely to show attachment to people outside the family. Day care children

were also found by the examiners to be more assertive, using 'I don't know' more often than the home reared children. However, the two groups were found to be similar in overall level of behavioural problems measured by a rating scale but on some subscales, day care children were significantly higher in temper tantrums, fears and activity level than home children.

Negative effects on social-emotional behaviour were also obtained from the Child Health and Education Study of pre-school effects in Britain (Osborn & Milbank, 1987). This longitudinal study collected information from mothers on children's anti-social and neurotic behaviour at age five and at age ten, teachers rated their conduct disorder, hyperactivity, application, extroversion, peer relations, anxiety and clumsiness. In addition, pupils self-concept was obtained as reflected by locus of control and self-esteem. Results of the regression analyses that adjusted for 17 background variables indicated that only day nursery children were significantly more hyperactive and extroverted at ten years of age. It is also interesting to note from this study that neuroticism at five years of age was highly correlated with maternal depression among the local authority day nursery children. However, after adjusting for this factor, the effect of the child care group became smaller. Self-concept of the children was unaffected by type of pre-school experience.

Interesting mixed results were found in Thornburg, Pearl, Crompton and Ispa's study (1988) of 740 children in Missouri over a five-year period. Child care history was recorded every year by parents and the children were rated by their teachers at five years of age on aggressiveness, quantity and quality of interactions with peers, compliance with

adults. The effects of home background factors were included in the analyses and conducted separately for black and white children. There were no significant differences between the black children. However, findings showed that white children who were home all five years were rated significantly more compliant with adults than children in all other arrangements. It is interesting to note that children who were cared for at home and those who were cared for in centres for all five years were found to be less aggressive than the children who had mixed care arrangements. This can mean that it is not the time spent away from home that matters but the stability of the care arrangments over the five-year period that made a difference to social development.

Supporting Thornburg and her team's findings that child care history may play an influential role in social behaviour, Andersson (1989) found that age of entry into care made a difference in child social behaviour. The Swedish study compared the social development of children from centre care, family day care and mixed care and did not find any differences between them. But Andersson found that children, assessed at 8 years, who entered day care as infants were rated more persistent and independent and were more verbal than other children. They were also found to be less anxious and their transition from pre-school to school was described by their teachers as less problematic. At age 13, the children were found more socially competent.

Similarly, Lamb, Hwang, Broberg & Bookstein (1988) study of children from Gothenberg, did not find that type of child care received in Gothenberg by children over a two year period was associated with children's social skills. The study found that the 'quality' of care, home or alternative care, was more influential in social development as

well as gender , degree of social support and prior social competence.

One may surmise that there are two general consequences of centre-care experiences for lower risk children. Centre-cared children have been found more cooperative, independent and were more peer interactive in some studies. This might have come about because they spent more time with a group of children and were more exposed to 'compulsory' interaction. Subsequently, children sharpened their social skills in negotiation and cooperation in a move to belong. It is then not surprising that in adapting and assimilating social challenges, especially in group care, these children were also found more anxious, aggressive and less compliant. This could be interpreted as maladjustment and anti-social behaviour.

Results from studies that did not find any difference in behaviours between home-cared and centre-cared children have shown that other contextual factors in children's care environment might be influential in their social development. For example, stability of care (Thornburg et al, 1988), age of entry into care (Andersson, 1989) and 'quality' of the care (Lamb et al, 1988).

2.2.2.3 Summary of the effects of early years education on lower risk children

Research findings on the effects of day care experience for lower risk children are somewhat less clear compared to findings obtained from disadvantaged children. Findings showed both positive and negative effects on children's development. Please refer to table 2.2 for an overview of the findings of the studies cited. This can be reflective of the multi-dimensional nature of the educational setting of the child especially where the home can

play an important role as well. It is shown that positive effects were obtained from both university and community based centre care for low risk children but there were other influential factors in the care environment that were identified. Of the studies that reported favourable effects from centre-care, some were limited by middle-class sample (Larsen & Robinson, 1989) and some were possibly confounded by mother's education(Melhuish et al, 1990a) and speech (Rubenstein, Howes & Boyle, 1981), mother's occupation (Clarke-Stewart & Gruber, 1984) degree of stimulation at home parental attitude (Larsen & Robinson, 1989). For those who found negative effects or no effects of centre care experience, there were other factors identified to be of considerable influence. These include the standard of care condition (Vandell & Corasaniti, 1990; Cochran, 1977, Lamb et al, 1988), age of entry into care (Andersson, 1989) and stability of care arrangements (Thornburg, et al, 1988). Therefore, the inconsistent results of research only point to the importance of considering the multi-dimensional nature of research into the care setting for children.

Along with this multi-faceted nature, there was a diversity of methods and measures used in research and may have created mixed results. In some studies, random assignment was conducted on children (Larsen & Robinson, 1989) and in others no random assignment was used (Rubenstein, Howes & Boyles, 1981; Clarke-Stewart & Gruber, 1984). For most of these, rigorous matching was done to make groups comparable (Vandell & Corasaniti, 1990, Goelman & Pence, 1987) or home background carefully controlled in analyses (Osborn & Milbank, 1987). But for most of these, initial differences between groups at start of study were not considered except for the Thomas Coram Study (Melhuish et al, 1990a, 1990b, 1991) and in Sweden (Lamb et al, 1988). Different

measures were also used, some were standardised measures, others used rating scales or observations of behaviour. It is difficult to tell which type of measure is sensitive enough to pick out the influence of day care experience. Therefore, it is not surprising that there is no consistent pattern in the general results.

However, as full day care for all children has become a necessity for both parents, where more mothers are opting to work, the issue of whether day care experience is good or bad for children appears 'obsolete'. Instead, the need to improve the standard of the day care environment is of concern not only to practicianers but policy makers for regulation and licensing. The next section explores studies that looked into the characteristics of the day care environment, specifically centre-based ones, that can influence children's development.

Table 2.2

Summary of Research Findings for the Effects of Day Care Attendance on Child Developmental Outcomes

Positive Effects		Negative / No Effects	
Study	Child Outcome	Study	Child Outcome
Larsen & Robinson (1989)	Better reading, language, arithematic and study skills for girls. Better reading vocabulary, spelling and language performance for boys	Osborn & Milbank (1987)	Lower in mathematics
Rubenstein, Howes & Boyle (1981)	Better language performance	Vandell & Corasaniti (1990)	Poorer grades in reading, language and mathematics (for extensive cared children) Poorer in basic achievement skills
Melhuish et al (1990a)	Higher levels of word combination	Andersson (1989)	No effects found
Clarke-Stewart (1984)	Better language comprehension, verbal fluency, know of concepts and memory span	Cochran (1977)	No effects found
Osborn & Milbank (1987)	Better language performance at 5 years Higher on intelligence and reading at 10 years		

Table 2.2 (contd.)

Summary of Research Findings for the Effects of Day Care Attendance on Child Developmental Outcomes

Positive Effects		Negative/No Effects	
Study	Child Outcome	Study	Child Outcome
Clarke-Stewart (1987c)	Better social competence with adult and peer strangers More independence of mothers	Vandell & Corasaniti (1990)	Negative peer relations, work habits and compliance Fewer positive nominations from classmates
Andersson (1989)	More persistent, independent and verbal Less anxious and problematic in transition from preschool to school	Rubenstein, Howes & Boyles (1981)	Less compliant Verbal less compliant Less attachment to people outside of the family More assertive More temper tantrums, fears and activity level
Howes & Olenick (1986) Howes (1987)	More social competence More self-regulation	Osborn & Milbank (1987)	More hyperactivity
Cochran (1977)	More play experience More peer interaction	Thornburg et al (1988)	Less compliant
Aureli & Procaci (1992)	More participation in activities More linguistic turns	Andersson (1989)	No effects on social confidence
Goelman & Pence (1987)	More cooperative play	Lamb et al (1988)	No effects on social skills
Osborn & Milbank (1987)	More extraverted		

2.3 The effects of different kinds of day care environment

Three approaches have been used in studies that examine the effects of environmental characteristics on child outcomes. A first approach to investigating features in the environment is to investigate the effects of regulatable features of the day care programme on enhancing child development. These include adult-child ratios, group size, caregiver education and training, physical space and materials. A second approach to examining the effects of the day care environment involves the more dynamic aspects of the setting such as the frequency and type of adult and child interaction and the activities children engage in.

The third approach used by some researchers assesses the overall standard of the care environment by combining discrete features of the day care environment that are considered by professionals as positive indicators for child outcomes. The composition of these specific indicators may include both structural and dynamic aspects of the environment entered into a global index score that measures the standard of care given.

This section begins by reviewing studies that used global assessments of the day care environment to established their relationship to child developmental outcomes The next section reviews studies that investigated the effects of the interactive experiences of the day care environment on child development. In addition, the relationship between the day care environment and the family environment is explored. As this research did not investigate regulateable aspects (such as adult-child ratio and group size) of the day care environment, a review is not included.

2.3.1 Effects of global 'quality' of the day care environment

The term 'quality' has been adopted by most empirical studies to represent a global assessment of the effectiveness of day care environment in promoting child development. Many studies used 'quality' indicators in an operative way which identify features of the environment that can be readily measured. The current review employs this term, where appropriate, when citing empirical studies that have adopted it. However, it is unwise to assume that a concept as elusive as 'quality' can be measured so simply without debate (Moss & Pence, 1995).

Investigations into the effects of 'quality' day care have used a variety of measures that yield a total score and this is taken to be the 'quality' of a day care centre. One example is the Early Childhood Environment Rating Scale, ECERS (Harms & Clifford, 1980), that measures seven areas of the day care environment. When these are added together, total assessment score is obtained and this may be considered the overall 'quality' of care for pre-school-aged children. ECERS was originally designed to improve teaching in different areas of the curriculum and its seven 'quality' dimensions of the day care were originally defined by professionals. These dimensions include personal care routines, creative activities, language-reasoning experiences, fine and gross motor activities, social development, furnishing and display and adult needs (more details of the ECERS are given in chapter three).

There are also other rating scales designed by the same authors such as the Family Day Care Rating Scale (FDCERS, 1980) and the Infant-Toddler Environment Rating Scale (ITERS, 1986). The former is applicable to care provided in a home environment other than the

child's own and the latter is similar to the ECERS but for a younger age group. Most recently, Harms, Jacobs and White (1996) designed a rating scale that assesses care given to school-aged children outside of school hours. This is the School-aged Care Environment Rating Scale (SACERS).

Other global measures adopted by researchers include State evaluation checklists used for licensing and regulating purposes (Kontos & Fiene, 1987). These usually consist of regulateable features such as adult-child ratio, caregiver education, space and materials, that represent the minimal requirements for day care to operate successfully. Some other researchers (Howes, 1988; Dunn, 1993) combine a set of structural and dynamic features in the day care environment to assess overall 'quality'. These features combined (i.e., regulatable or structural, combined with interactional or 'process' measures) are considered by professionals to represent the ideal indicators for enhancing child development. The use of the several 'quality' assessments in predicting positive and negative child outcomes will be discussed in the following sections.

2.3.1.1. Effects of centre day care 'quality' on cognitive/language development

Findings from investigations into the effects of day care 'quality' have been inconsistent. Various measures of 'quality' have been used to predict children's cognitive and linguistic development and many studies have found positive relationship between 'quality' and child outcomes. However, no effects were also reported by some researches and these are included in the following review.

Positive effects of 'quality' centre care were found by the Bermudian study (McCartney,

Scarr, Phillips, Grajek & Schwarz, 1982; McCartney, 1984, 1987) that used the ECERS to rate nine centres out of a population of ten. The range of score obtained was 1.8 to 5.2 out of a total score of seven. This meant that day care centres in Bermuda varied widely in 'quality' from nearly inadequate to good. The sample included 166 children, aged 36 months to 68 months and were assessed on verbal intelligence, intellectual development and language development. McCartney and her team recognised possible confoundment between centre 'quality' and family background. Therefore, they took family income, age and education of parents and their values into account in their statistical analyses. It is interesting to note from their results that parental values were highly correlated with the 'quality' of centre care. They found that parents who selected high 'quality' day care centres placed more value on social skills and less on conformity for their children. In this tight design, with parental values partialled out, it was found that the ECERS positively predicted language competence like verbal comprehension, production and fluency in children. This means that higher scores in language development were associated with higher 'quality' day care scores. However, the 'quality' measure was not correlated with the children's intellectual development as measured by a standardised test.

Another study in Montreal, Canada (Schliecker, White & Jacobs, 1991) also used the ECERS to assess 11 day care centres. Instead of assigning a centre 'quality' score to each of the 100 children sampled, the centres were grouped into 'high' and 'low' 'quality'. Except for one centre that had a moderate 'quality' score and was eliminated, five centres were categorised 'low' with scores ranging from 93 to 131 (mean of 2.5 to 3.5)and five were grouped 'high' with scores ranging from 190 to 239 (mean of 5.1 to 6.5). Hierarchical multiple regression analyses was conducted with social economic status

included in the first instance and followed by the dummy coded 'quality' groups. Like the Bermudian study, results were also positive in that both social economic status and the 'quality' of day care centre positively predicted language comprehension significantly. This meant that higher language scores were associated with higher social economic status and higher day care 'quality'.

Similarly, Dunn (1993) studied 30 day care classrooms in 24 centres and found positive effects of day care 'quality' on child outcomes when ECERS was used for assessment. A sample of 100 children between the ages 36 and 60 months were randomly selected from the classrooms for assessment of cognitive development. This was measured by a teacher rating scale on intelligence, an achievement test on cognitive performance and an observation that assessed complexity of cognitive play. Initial correlational analyses showed that only the rating on intelligence significantly correlated with the ECERS score but not for cognitive play. A simultaneous entry of ECERS, caregiver training and experience were entered into a multiple regression analysis with SES, maternal education and income partialled out. Results showed that the three 'distal' features together predicted intellectual development positively. This meant that higher ECERS 'quality' classrooms had trained caregivers with little working experience and these classrooms had children who obtained higher ratings on intelligence. It appeared to imply that in better 'quality' centres, higher levels of professional training compensated for lack of teaching experience. However, among the three variables, professional training was the most significant predictor which indicated the importance of proper training for caregivers.

It should be noted that the children were not randomly assigned (although they were

randomly selected from classrooms for study), and the age range of sample was wide (36 to 60 months) resulting in a wide variation of entry age into care. Dunn reported no significant relationship between child outcome and age of entry, but did not include a pre-assessment or baseline measure of their cognitive ability. Because of the varying length of enrollment of children in the care programme, it is possible that there was significant variation of developmental levels at the start of study which unfortunately was not considered in analyses.

Pre-test scores were used as baseline data in Beller, Stahnke, Butz, Stahl & Weßels' (1996) research on day care centres in Munich, Germany. The ECERS and the subscales were also used to examine the effects of day care 'quality' on children's outcomes. A sample of 122 children (age six months to 24 months of age) were assessed on a comprehensive developmental battery of tests. Results showed that language, cognition and level of play outcomes were significantly predicted by higher 'quality' scores of language-reasoning experiences and provision for adult needs measured by the ECERS. However, the total score from ECERS was not found a significant predictor of children's outcomes. This could mean that the subscales were sensitive to the variation of language, cognitive and play levels of children. Needless to say, language-reasoning activities were specifically designed to enhance language and cognitive development. Supporting Dunn's (1993) findings, Beller and his team also found that the adult needs subscale predicted children's outcomes reaffirming the importance of professional growth and training for caregivers.

It is also noted that from the sample, 80% of the children came from two-parent families

and 20% from one-parent families. It is possible that if analyses were conducted separately for these two groups results may be different. Note that Schliecker, Jacobs and White (1991) found that day care 'quality' was more related to children from one-parent homes. However, because the researchers were restricted by data protection in Germany, background variables could not be included in the analyses, which could confound the effects of the ECERS subscales.

The Head Start programme was also examined for the relationship between its'quality' and effectiveness in compensating for the disadvantaged background of its children. Bryant, Burchinal, Lau and Sparling (1994) used the ECERS to rate the 'quality' of Head Start classrooms in a two-year study of 145 children from 32 Head Start classroom. They used the hierarchical linear model that took into account the association between child and centre variables measured at different levels. They found that children from higher 'quality' Head Start classrooms did better on measures of achievement and preacademic skills despite their having come from poorer 'quality' of home environment. It was also found that children who came from better home environments also benefited more from higher 'quality' classrooms especially in the area of problem-solving and reasoning than children who came from poorer backgrounds. However, it was reported that 'quality' of classrooms did not significantly predict the children's performance on assessment of expressive, receptive and written language. The study provides evidence that compensatory education improves intellectual development but also the added benefit of providing higher 'quality' programmes for disadvantaged children.

Another approach to assessing global 'quality' of centre care was used by Howes (1988)

when five regulatable dimensions were combined into a composite index score. These dimensions included: teachers who received formal preservice training in child development, small groups (less than 25 children), low child to adult ratio (8:1), a planned and individualised educational programme and adequate physical space. According to Howes' definition, high 'quality' care included all five dimensions, medium 'quality' care included only three or four dimensions, and low 'quality' care included less than three dimensions. Howes assumed in this composition of day care features that each indicator would influence child outcome equally. This is unfortunate in that some features may have a stronger influence on child outcomes and the weight of each feature was not considered. For example, a low 'quality' centre with small groups and caregiver training may be better off than another low 'quality' centre with small adult-child ratio and adequate physical space. This is because children in the former centre may be more stimulated by trained staff in small groups than children in the latter centre that have space to move, more adult attention but less 'quality' interaction from caregivers.

Nevertheless, using these criteria for 'quality', Howes (1988) investigated the effectiveness of this 'quality' index on the school adjustment of 87 children in a university-based elementary school at age three. The children were assessed two years after enrollment at kindergarten and one year into the first grade on academic progress and school skills (independence, group and participation skills). Regression analyses were used separately for boys and girls with family background variables controlled. The findings indicated that high 'quality' and stable care arrangements for boys predicted academic skills but only stable care arrangements for the girls was significantly associated with child outcomes. High 'quality' care for both boys and girls predicted school skills

essential for achievement at school. It should be noted that this study was carried out at a university-based laboratory school and generalisation was therefore limited to other similar centres. Parents in this study were also highly motivated and therefore this may have confounded the effects of 'quality' centre care.

From the above research, it can be argued that there is some evidence that the 'quality' of centre care enhances intellectual and language development in children. This is more so for disadvantaged children as seen in the Head Start study. On the other hand, some studies have reported a lack of effects, that is, 'quality' of centre care was not related to cognitive and language outcomes.

One such study by Kontos and Fiene (1987) used four measures of 'quality' to examine the effectiveness of the day care environment on cognitive outcomes of 100 randomly selected children (average age 53 months) in Pennsylvania. Three of the assessments were considered the 'floor' of 'quality' measures which means minimum requirements of what was considered by professionals needed to enhance development. The first of these was the Child Development Program Evaluation Scale (CDPE), a comprehensive measure that determined the degree of compliance with regulations in Pennsylvania. The second 'quality' measure used was a 15-item checklist that comprised of the best predictors of the total scores from the full scale (CDPE). The third of these 'floor' measures was an observation form, the Caregiver Observation Form and Scale, that focused on caregiver behaviour. Kontos and Fiene also used a fourth measure of 'quality' which was the ECERS.

A regression analysis was conducted in which the child's age, family background (parental values, home stimulation) and centre experience were controlled to establish the effects of centre 'quality' on child outcomes. However, results indicated that none of the four measures of 'quality' predicted intellectual functioning and language competence (Kontos, 1991). Instead, age of child, age of entry into centre care, parental value and mother's education were found to be significant predictors of the child outcomes. The study established that children with mothers who had higher level of education and who entered day care earlier were better in cognitive outcomes. Also, children who were older, with better educated mothers and parents who preferred social values, did better on language measures.

Similarly, no effects of centre 'quality' were found in Goelman and Pence's (1988) study of three types of care in Canada. The effects of 'quality' of licensed day care centres, licensed family day care and unlicensed family day care on 105 children, their parents and teachers were examined. The 'quality' of the three types of care were assessed on the ECERS for centre care and the Day Care Home Environment Rating Scale (Harms, Clifford & Padan-Belkin, 1983). Children were assessed on their language development by a standardised test and results showed the 'quality' of family day care positively predicted language outcome for children but the ECERS did not. Like Kontos' study, maternal education level was found to be a significant predictor of language development.

A possible explanation for these lack of significant effects of the ECERS is that the range of scores obtained for each study varied. For the Bermuda study, McCartney (1984) obtained a range of 1.8 to 5.2 which meant that there were bad centres and good ones in

her sample of centres. Therefore, this allowed for more robust analyses. In contrast, Kontos (1987) and Goelman and Pence (1988) found ranges that hovered above the minimal rating. For the Pennsylvania study, Kontos' centres were minimal to good and for the Canadian study, Goelman and Pence reported the average centre to be more than minimal. Therefore, the lack of ECERS effects could be due to the small variation. Possibly the centres were good enough, i.e. mid-range ECERS score was the threshold of 'quality' effects.

The threshold of the effects of day care 'quality' can also be seen in Hwang, Broberg and Lamb's longitudinal study (1991) in Sweden. The effects of 'quality' of in-home and out-of-home care were investigated on 140 first born children's intellectual development measured by a standardised test. In this study, 'quality' was assessed by the Belsky and Walker's Checklist (1980) that consisted of positive and negative events related to the caregiver and child behaviours. Occurrence of positive events (caregiver elaborating verbally or making routine into learning experience, and child exploring non-toy object) and negative events (child crying, caregiver prohibits child action, children waiting) were recorded. A composite index score from the checklist was used as a measure of centre care 'quality'.

With pre-test, home background and child characteristics included in the analyses, the 'quality' of out-of-home care did not predict intellectual development in children. Instead, for this study the best predictors were 'quality' of home care and pre-assessment scores. As it is noted that Sweden provides high 'quality' care for all their children, the lack of significant effects may imply that there is a threshold of 'quality' needed by children.

'Quality' of home and the sociability of the child predicted intellectual outcomes, implying that there may be more variation in the home environment in Sweden than there is in the day care environment.

In sum, it has been found that the 'quality' of the day care environment positively predicted children's cognitive and language development. However, some studies that did not find any significant effects of day care 'quality'; there appeared to be a threshold of 'quality' and only if it falls below a minimum will it adversely affect children's development. In addition, other variables such as the 'quality' of home emerged as significant predictors of child outcomes supporting the contention that investigations into day care effects should use a broad multi-variate approach (Melhuish, 1993; Katz, 1993 &1994).

2.3.1.2 Effects of centre day care 'quality' on social-emotional development

A review of research findings on the effects of centre care 'quality' on social-emotional development also showed mixed results.

In the Bermuda study, Phillips, McCartney & Scarr (1987) measured 'quality' using the ECERS and found a positive effect on social-emotional development. With family background and parental values controlled, it was found that children in high 'quality' centres were rated more considerate and sociable by caregivers and their parents. The study also found that children from lower 'quality' centres were rated higher on dependency. In addition, emotional maladjustment and hyperactivity was also associated with low 'quality' but these were weak effects as the variance explained was small.

Emotional maladjustment was also negatively predicted by 'quality' in Kontos and Fiene's Pennsylvania study. One of the four 'quality' measures used by the research, the concise version of the state's licensing evaluation instrument, showed that higher centre 'quality' scores were associated with less emotional maladjustment in children (Kontos, 1991). The study also used a combination of structural features (i.e., smaller group size, director's experience and staff experience) and found a significant positive association between this combination of 'quality' features and children's sociability (Kontos & Fiene, 1987).

Similarly, Howes (1988) used a combination of five discrete aspects of the day care setting to reflect 'quality' and found that teachers rated children who came from high 'quality' day care centres having fewer behavioural problems than those from lower 'quality' centres. In another study, Howes (1990) followed children from infant to pre-school age and found similar results, i.e., there were fewer children with behavioural problems in centres of higher 'quality'. This study used a different set of 'quality' features; adult-child ratio, caregiver training and stability of caregivers, to investigate its effect on social behaviour of children. It was found that as toddlers, children enrolled in high 'quality' care were more compliant and displayed more self-regulation. When they were pre-schoolers, children in high 'quality' centres displayed more positive affect during peer play and were engaged more in social pretend play. In contrast, children enrolled in low 'quality' centres were rated by their teachers as having difficulty with peers and they were rated to be more hostile as kindergarteners. However, a limitation of the findings of this study was that Howes used data from the 'quality' of day care at infant age only. It is likely that 'quality' of pre-school and kindergarten provision varied during the follow-

up years and this can influence outcomes in ways the researchers did not consider.

Vandell and Powers (1983) also found positive interaction with adults and positive talk among children from high 'quality' centres. Their study defined 'quality' according to number of trained staff, number of children, adult-child ratio and number, condition and availability of toys. Using this criteria two day care centres, each from 'high', 'moderate' and 'low' 'quality' group were identified. It was found that in all three types of centres, children were very likely to engage in solitary behaviour, social interaction with peers and positive talk. However, it was observed that unoccupied behaviour and behaviour with adults varied widely according to 'quality' group. Children in high 'quality' centres were more likely than children in 'moderate' or 'low' centres to interact with adult positively and engage in positive talk. Children in low and moderate 'quality' centres were more likely to engage in solitary and unoccupied behaviour than children from 'high' 'quality' centres.

To follow-up, Vandell, Henderson and Wilson (1988) investigated the longitudinal development of 20 of the 55 children from the above study. At eight years of age, children were observed for compliance, task orientation, emotional well-being and peer relations during a 45-minute play session in a laboratory play room. The study found that children from higher 'quality' centres spent more time in friendly interactions and less time in unfriendly interactions. Children from higher 'quality' centre care were also rated by observers to be more socially competent and had positive affect. Finally, the researchers found that children from poorer 'quality' centres received more shy nominations from peers. It is interesting to note that although all the families used in this study were middle

class, Vandell, Henderson and Wilson found that higher SES parents in this range selected higher 'quality' centres. This meant that there was a range of middle class families in the sample and this feature was taken into account in their regression analyses. It is also noted that the 'quality' of environment both centre and home between the initial observation and follow-up was not taken into account. This could possibly have some influence on children's development.

So far, studies explored in this section have found centre care 'quality' a significant predictor of social-emotional development. This meant that higher 'quality' of centre care has been shown to be positively related to pro-social behaviours, positive interaction with adult and peers and emotional adjustment. However, some studies that appeared to have obtained contrasting results in that no associations or negative ones were obtained.

One such study was by Howes, Phillips and Whitebook (1992) in which sociability was investigated. 'Quality' items from the ECERS (for pre-school age) and the Infant-Toddler Environmental Rating Scale, ITERS (for infant and toddler) were factor analysed in this large scale study. This resulted in two subscales of 'quality' which were appropriate caregiving subscale and developmentally appropriate activities. The former consisted of interactive and supervisory elements of the environment and the latter, developmentally appropriate activity which included materials, schedule and activities of the classroom. Observations were conducted on 414 children for whom social orientation scores were available. Results showed that children classified as both adult and peer oriented were more likely to be enrolled in classrooms rated higher in developmentally appropriate activities than children rated as solitary. However, there was no significant association between children's social orientation and 'quality' of appropriate caregiving.

A mix of positive and negative results were also found in Dunn's study (1993) in which sociability and social adjustment were investigated. 'Distal quality', in the form of caregiver's experience, was used and found to be negatively associated with children's sociability scores. This meant that children who were less sociable were found with more experienced caregivers. This was unexpected but it was noted that the 'distal quality' feature was a weak predictor. In contrast, 'proximal quality', as represented by classroom limits and variety was found a stronger predictor of social adjustment. Results showed that where classrooms had more limits and less variety, children were rated as less well adjusted. Similar results were obtained with children's level of social play. More complex social play were found in classrooms where more limits were set, however, it was found that the average level of social play was quite low.

Similar mixed effects were reported by Bryant et al (1994) in their study of 'quality' of Head Start classrooms. In this two-year study, 145 children were assessed on social development measures such as school readiness skills and social-emotional behaviours (compliance, disruption and expressiveness). With 'quality' of the home environment adjusted, higher ECERS scores on classrooms was found significantly related to school readiness skills but this was not found with the social-emotional behaviour.

Some studies reported no effects of centre care 'quality' on children's social-emotional development. One such study was the Swedish longitudinal study (Hwang, Broberg & Lamb, 1991; Lamb, Hwang, Bookstein, Broberg, Hult and Frodi, 1988; Lamb, Hwang, Broberg & Bookstein, 1988) that used a global measure of 'quality' (Belsky & Walker, 1980) consisting of positive and negative events that relate to caregiver and child

behaviours. Peer skills and sociability were observed at start of the study and at three other time points (three, 12 and 24 months later). The results at the fourth assessment indicated that earlier social skills, gender, 'quality' of home and 'quality' of alternative together contributed significantly to children's social skills. However, specific findings indicated that home rather than child care setting had a stronger influence in development. Again this may have reflected the homogeneity of standards among the state supported centres in Sweden as noted by Andersson (1989) and perhaps the threshold in which 'quality' of day care can be effective is reached.

Another study by Beller, Stahnke, Butz, Stahl & Weßels (1996) in Munich, Germany did not establish any association between centre care 'quality', measured by the ECERS and social-emotional development. However, observations of children's responsiveness, exploring, goal directedness, aggressiveness and fearfulness, were closely associated with caregiver-child interactions. This seemed to suggest that relationship with caregiver may be more important and sensitive to children's social-emotional growth than an overall 'quality' of the centres as measured by ECERS.

2.3.1.3 Summary of the effects of centre day care 'quality'

In sum, it appeared that high 'quality' day care has been established by some studies to be a positive and significant predictor of cognitive performance such as academic, problem-solving and reasoning skills (Dunn, 1993; Bryant et al, 1994; Howes, 1988). It has also been established by many studies that high 'quality' in the day care environment was effective in enhancing language development (McCartney, 1984; Beller et al, 1996). However, some studies did not find any effects like Kontos and Fiene (1987); Goelman

and Pence (1988) and Hwang et al (1991).

Some studies have also found that children from higher 'quality' day care centres were more socially oriented, had fewer behavioural problems, were more independent and ready for school. In contrast, children in lower 'quality' centres have been rated more hostile, experience emotional maladjustment and more solitary. However, there were also research studies that did not demonstrate effects of global day care 'quality' on social-emotional development (Howes, Phillips & Whitebook, 1992; Bryant et al, 1994; Beller et al, 1996). A summary of these findings is presented in tables 2.3 and 2.4.

It is not surprising that there exists inconsistencies in results have been found given the variety of methods and measures (standardised tests, rating scales and observations) used in assessing both children and centres (Clarke-Stewart, 1987c). Furthermore samples from various age groups and locations (SES, state and country) were used. Another possible explanation for the inconsistencies indicated by those studies that did not establish any effects (Kontos & Fiene, 1987; Goelman & Pence 1988; Hwang et al, 1991), is that family factors were effective in enhancing child development and these have not always been controlled. Such family factors like mother's education, maternal IQ, 'quality' of home environment and parental values must be partialled out from the influence of day care 'quality'. Day care effectiveness research must take into account the influence of the home environment on the child's development.

Other indicators of extraneous influence in the study of day care effectiveness can be seen in two studies reviewed above. Although these studies did not establish the impact of day

care 'quality', Dunn (1993) and Beller et al (1996) did find that classroom activities (variety) and caregiver behaviour (positive) enhanced children's positive social behaviours. Given these indications, further investigations have been conducted by researchers to examine the more dynamic features of the day care environment. Children's experience with task activities and curriculum as well as their social interaction in the day care setting. These studies are reviewed in the next section.

Table 2.3

Summary of Research Findings for the Effects of Global 'Quality' of Day Care on Cognitive and Language Outcomes

Positive Effects of 'Quality' Day Care			No Effects of 'Quality' Day Care		
Study	'Quality' Measure	Child Outcome	Study	'Quality' Measure	Child Outcome
McCartney (1984)	ECERS	Better verbal comprehension, production and fluency	Kontos & Fiene (1987) Kontos (1991)	Child Development Program Evaluation Scale (CDPE), CDPE Indicator Checklist, Caregiver Observation Form and Scale, ECERS	No effects on intellectual functioning and language competence
Dunn (1993)	ECERS	More intelligent	Goelman & Pence (1988)	ECERS	No effects on language outcome
Beller et al (1996)	ECERS (Language-reasoning and adult needs subscales)	Better language and cognition Higher level of play	Hwang et al (1991)	Belsky and Walker's Checklist	No effects on intellectual development
Bryant et al (1994)	ECERS	Better school achievement, preacademic skills, problem-solving and reasoning	Bryant et al (1994)	ECERS	No effects on expressive, receptive and written language
Howes (1988)	Composite of 5 structural dimension	Better academic skills for the boys School skills for boys and girls			

Table 2.4

Summary of Research Findings for the Effects of Global 'Quality' of Day Care on Social-emotional Outcomes

Effects of 'Quality' Day Care			No Effects of 'Quality' Day Care		
Study	'Quality' Measure	Child Outcome	Study	'Quality' Measure	Child Outcome
Phillips et al (1987)	ECERS	More considerate, sociable and independent Less emotional maladjustment and hyperactivity	Howes, Phillips & Whitebook (1992)	ECERS: Appropriate caregiving	No effects on social orientation
Kontos (1991)	Pennsylvania State License Assessment	Less emotional maladjustment	Bryant et al (1994)	ECERS	No effects on social-emotional behaviour
Howes (1988)	Composite measure of staff training, group size, adult-child ratio, programme and physical space	Less behavioural problems	Hwang et al (1992)	Belsky & Walker Checklist	No effects on social skills
Howes (1990)	Composite measure of adult-child ratio, caregiver training and stability	More compliant, self-regulation and positive affect More involvement in social pretend play	Beller et al (1996)	ECERS	No effects on responsiveness, exploring, goal directedness, aggressiveness and fearfulness
Vandell, Henderson & Wilson (1988)	Composite measure of caregiver training materials, adult-child ratio, group size	More time spent in friendly interactions More socially competent and positive affect Less shy nominations from peers			

Table 2.4 (contd.)

Summary of Research Findings for the Effects of Global 'Quality' of Day Care on Social-emotional Outcomes

Effects of 'Quality' Day Care			No Effects of 'Quality' Day Care		
Study	'Quality' Measure	Child Outcome	Study	'Quality' Measure	Child Outcome
Vandell & Powers (1983)	Composite measure of number of children and teachers, adult-child ratio, staff education, square footage per child, number, condition and availability of toys	More positive interactions with adults More positive talk Less solitary play and unoccupied behaviour			
Howes, Phillips & Whitebook (1992)	ECERS: Developmentally appropriate activities	More adult and peer orientation			
Dunn (1993)	'Proximal quality' of more classroom limits	More complex social play			
	'Distal quality' of more classroom limits and less variety	Less well-adjusted			
Bryant et al (1994)	ECERS	Better school readiness			

2.3.2 Effects of the interactive experiences in the day care environment

The contribution of day care 'quality' to child development has received a large amount of attention. However, what goes on in the day-to-day experiences of day care is also very important and effort to extract and identify specific features that are associated with positive child outcomes has also been attempted by many researchers. The indicators explored in this section relates to dynamic features of the day care environment. This is broadly the nature of the child's interactive experience with the caregivers or peers and with activities offered by the day care programme. Studies reviewed in this section relate to these two set of features.

2.3.2.1. Effects of interactive experiences with caregivers and peers

Adult responsiveness, degree of warmth and amount and quality of interaction and peer interaction were found to be influential on children's development. This section reviews studies that examined the effects of these behaviours on cognitive and language development first and social-emotional outcome next.

The effect caregiver interaction was examined by Rubenstein and Howes (1983) on language development. Observations of interactions were made and 10 centre-cared and 13 home-cared children were assessed on standardised measures of language development and their mean utterance length recorded at 18 months of age. The study found that verbal stimulation from the caregiver, in a positive affective context facilitated language development in children. It was also found that adult restrictiveness was negatively related with mean utterance length from the child. This suggested that children's language development was enhanced by positive stimulation and less restrictiveness from the adult.

Results from the National Child Care Staffing Study or NCCSS (Whitebook, Howes & Phillips, 1989) supported Rubenstein and Howes' findings. The study examined the development of 255 infant, toddler and pre-school children and investigated staff behaviour which were responsiveness, degree of sensitivity, harshness and detachment towards children. They found that children with higher scores in language development had teachers who were more responsive in their interactions, more sensitive and less detached.

The quality of caregiver interaction was also examined by Nabuco and Sylva (1995) in relation to the performance of children from three pre-school curriculum in Portugal. The study compared the academic performance of children from High/Scope, Formal Skills and Movimento da Escola Moderna curriculum groups. They found that High/Scope children, who scored highest in reading and writing assessment and perceived themselves to be more socially accepted and competent, were cared for by adults who 'extend' children's play. This means that teachers in High/Scope were observed to be more supportive in their interaction and there was more incidence of 'scaffolding' was recorded by the researchers.

Similar results were also established by Melhuish et al (1990b) who investigated the effects of interactional experiences on language development of 225 infant children. In their previous study Melhuish et al (1990a) established variation in interactional experiences according to types of care; they found that adult responsiveness to child's communication was different between each type of care. The study continued to investigate the effects of adult responsiveness on language development as reflected by the total word combination produced by children. The results indicated that children who

were able to produce more word combinations at 18 months had caregivers who communicated more and were more responsive to them. A further examination (Melhuish et al, 1991) of the same cohort of children at age three years showed similar results.

Besides caregiver responsiveness and amount of communication, other aspects of interaction within the day care setting were investigated by McCartney (1984). The function of verbal interactions between caregiver and child, type of social grouping, child's role in conversations and interaction with peer can also be considered indicators of day care 'quality'. McCartney used observations of coded verbal interactions and investigated how these can affect cognitive and language outcomes of children.

Like the other studies reviewed above, this study also found a relationship between functional utterances made by adults and better language development in children. It was also reported that children with better language outcome had adults who were less controlling in their communication. Settings that have more control utterances were also observed to have less representational utterances. This means that caregivers who were less controlling (fewer comments such as "stop talking") were more instructive ("the shiny, new toys are over there"). McCartney concluded that children fared better in centres with higher proportion of representational utterances.

In addition, the study showed that children fared better in a group situation where representational utterances occurred more frequently than on a one-to-one basis with caregiver whose utterances were mainly about control. Also centres in which children initiated talk with adults more often had children with high scores in language

development. On the other hand, it was found child initiated conversations were negatively associated with language development. Also, more verbal initiations among peers was associated with more aggressive behaviour and anxiety in children. There was a negative relationship between talk with caregivers and with peers. This research suggested that the amount of talk with adult supersedes the amount of peer talk in the centres. This could have led to less exposure to positive peer interactions and if there are any, the content of the interactions did not facilitate prosocial behaviours.

A similar finding was obtained by Hadeed (1994) in which interactions in two types of pre-schools; educationally oriented and care oriented, were compared. This Bahrain study found that children from educationally oriented pre-schools were better in performance on cognitive assessments and were more socially competent and had fewer behavioural problems than children from care-oriented pre-schools. Observations of adult-child interactions showed that children in educationally-oriented pre-schools had caregivers who were significantly more involved and supportive of their learning than staff at care-oriented pre-schools. Hadeed also found that the children who made more progress at the educational pre-schools were more likely to have dialogues with adults while care-oriented pre-school children were more likely to have child to child conversations.

One study that did not support the results above was Clarke-Stewart's (1987b) study of 80 children in Chicago. She found that the number of explanatory or informative sentences spoken by caregiver to children and the amount of time teacher spent giving lessons were not related to children's cognitive development. A possible explanation, by Clarke-Stewart, was that the information and explanation given by teachers was oriented

towards getting along with peers and pro-social behaviours, not with academic content. This appeared to be indicated by the finding that children who heard more informative and explanatory sentences and received more direction from their teachers were more competent with unfamiliar peers. It seems that not only was the amount and quality of interaction important but also, as indicated by this study, the content and context of the interaction were especially influential on social competence.

Clarke-Stewart's study showed that interaction with teachers can influence social development of children especially in positive interaction with peers. Other studies have supported her results. One such study by Tzelepis, Giblin and Agronow (1983) of 16 pre-school children from two child care centres. They looked at changes in children's social interaction at two time points and its relationship with frequency and nature of adult-child interactions to these behaviours. Their results showed that the number of peer interactions decreased over time in the centre characterised by fewer adult-initiated contacts with children and by less appropriate adult responses.

The Bermuda study (Phillips, McCartney & Scarr, 1987) found that where there was higher amount of verbal interaction with caregivers, children were more considerate, sociable, intelligent and task oriented. However, they also found that higher amounts of verbal interaction with peers related to higher amount of aggression and anxiety among children. It seemed that peer interaction produced negative effects. This finding supports those studies like Hadeed (1994) in which peer interaction did not appear to play an important part in enhancing child development. This may mean that interaction with the adult may be more effective than interaction with peers and underlines the importance of

the role of the adult in facilitating positive peer interaction.

Results from the Atlanta sample of the NCSS study (Whitebook et al, 1989) found a positive relationship between prosocial behaviour in children and caregiver warmth. The study found that sociable children had teachers who were more sensitive, less detached and harsh with them. Also, more time spent in higher levels of play and purposeful activities were found among children whose caregivers were less likely to ignore children, less harsh, more responsive and intense with their interaction with children. The study also found that children who were more securely attached to caregivers were less often ignored and more often responded to by their caregivers. Similarly, Anderson, Nagle, Roberts and Smith's (1981) investigation reported that more securely attached children had highly involved caregivers compared with children who had less involved caregivers.

Pro-social behaviour was also found to be higher among children who had more interaction with caregivers by Holloway and Reichhart-Erickson (1988). This study of 55 children age from 48 to 59 months rated 15 classrooms on teacher-child interaction, child-child interaction and physical environment. Results indicated that children who experienced high quality interactions with teachers had higher scores on prosocial responses. However, when social class was considered in the analysis, the relationship between high quality interactions with teacher and the outcome was partialled out indicating the intervening influence of home background.

In general, the studies cited above showed a relationship between verbal interaction and caregiver support of learning and children's language development. Findings also

indicated that caregiver responsiveness and involvement in a positive affective context enhanced social competence and prosocial behaviours among children.

2.3.2.2 Effects of involvement with different types of activities

Children in centre day care experienced not only interaction with individuals in the setting but also an environment that offers a variety of activities. It has been found that children's activities at day care affects their progress (Sylva, Roy & Painter, 1980; Jowett & Sylva, 1986; Smith & Connolly, 1986). This section reviews studies on the effects of different types of curriculum and activities offered by pre-school programmes. Some studies made comparisons of activities offered by various curricula in pre-school settings. Others examined the effects of these variations on child outcomes.

A comparison of the effects of different programmes was conducted by Schweinhart, Weikart & Larner (1986) and Schweinhart & Weikart (1997). Three curriculum models were used in their study in which children were randomly assigned to programmes differing in the degree of initiative expected of children and teachers. The Distar direct-instruction approach involved more prescription from the teacher and children are expected to respond to adult instructions. The High/Scope programme used a more open approach in which both children and teacher initiate and plan activities. The third curriculum model was child centred in its approach and with adults showing less initiative. This 'traditional nursery' programme expected teachers to be involved only when requested by the children.

The team assessed 68 children from disadvantaged background who were randomly

assigned to these three programmes at ages 3 and 4. At age ten, they found very little differences between the three groups in intellectual performance. However, at ages 15 and 23, differences were more obvious in social behaviour between the three groups. It was found that the Distar group had significantly more acts of criminal behaviour, property damage, drug abuse and running away from home. In contrast the High/Scope group of children had more positive behaviours. From the results of this longitudinal study, it appeared that the type of curriculum was an effective influence on social consequences of young children. The High/Scope approach which had more 'structure' but was not didactic appeared to prevent anti-social behaviours.

Another study that compared the effects of different curricula was by Nabuco (1997) in Portugal. The three curricula examined in this longitudinal study were the High/Scope programme, Formal Skills and Movimento da Escola curricula groups. A sample of 233 children were followed from nursery to primary school. Cognitive and social assessments showed that attendance in the High/Scope programme was associated with higher scores on reading, writing and social acceptance and competence compared to the other two groups. On examining the most frequent activities of children in different curricula, the research attributed the better reading and writing progress among High/Scope children to their greater involvement in 'literacy-cultural' activities. The children spent more time in pretend play, informal conversation in pairs or small groups. The children were also observed to be more involved in examination and problem-solving which may have helped them become more active learners. Children in High/Scope curriculum had a balance of free and guided choice whereas children from Formal Skills had little choice and those in Movimento da Escola Moderna had unlimited choice. These experiences in the

High/Scope group could have possibly given the children a good start in primary school.

From the results of the curriculum studies, it can be said that the opportunity for teacher and child initiation in activities and a balance of free and guided choice of activities which were more 'literacy-cultural' and cognitive ones appeared to enhance child learning and feelings of competence.

Another study conducted by Smith and Connolly (1986) observed children's social behaviours in two types of pre-school programme. Children were matched and randomly allocated into either a 'structured activities programme' or 'free play programme'. In the structured activities condition, adults were more involved and structured children's activities. In contrast, the adults in the free play programme were less involved and only responded to children at their request. Observations of children's behaviours were recorded and the research found that in the structured activities programme, there was more table play as most activities were organised around tables. There were also records of no activity as children spent time sitting and waiting. Group play with peers, fantasy play and, in general, more vigorous physical activities were recorded in free play programme.

In terms of child outcomes, the frequency of aggression between the two groups was examined and little difference was found. However, the study noted that there was an increase in aggression over time (duration of eight months) with children in the structured activities group indicating that a lack of peer interaction may have adverse effect on children's ability to interact with each other cooperatively. This finding appeared to

reflect the findings of McCartney (1984) and Hadeed (1994) in which more peer interaction was found to be associated with negative outcomes. One possible explanation can be that in Smith and Connolly's study, the firm structure of the programme did not allow sufficient peer interaction for the development of social skills.

However, measures of attention span showed a steady increase over time in children from the structured activities group but not with the free play group. The researchers also included standardised cognitive assessments but these did not reveal any significant difference between the two groups. It is possible, in this study, that this lack of difference was attributed to the middle class background of the children.

It appeared that structured activities, in this study, involved more adult stimulation and interaction at the price of opportunities for peer interaction. Although the children were involved in less play, the programme enhanced their attention span which was beneficial for school readiness. On the other hand, children in free play programme were skilled at peer interaction but were less attentive in their tasks. Perhaps a balance of structure and free play may be the optimal setting for developing positive child outcomes. Nabuco (1997) found that the mixture of guided and free choice in High/Scope gave the children a sense of competence and suggested that this helped them achieve at school.

The effects of educationally oriented and care oriented pre-schools were also studied by Hadeed (1994) in Bahrain. Observations were made of children's typical activities in each of the settings. It was found that children at educational pre-schools spent more time at challenging tasks and had longer periods of concentrated play than children from care-

oriented pre-schools. They were also more inclined to initiate tasks that involved purposeful movement and problem-solving. In contrast, children from care-oriented pre-schools spent significant more of time in adult directed activities in which they are all given the same activity and at the same time. They were also observed to spend a disturbing amount of time sitting and waiting. On child outcomes, the study showed that children from educationally oriented pre-schools performed better on standardised intelligence tests than the children from care oriented pre-schools. Children from educationally oriented pre-schools were also found to have fewer behavioural problems and perceived themselves as more socially accepted and competent.

Similarly, Sylva, Roy and Painter (1980), as part of the Oxford Pre-school Project, compared day to day experiences of children from nursery schools, nursery classes and playgroups in Britain. The study found differences in curriculum and task activities offered by each setting. Playgroups were observed to offer more free play activities and adult-led games and stories. In contrast, the nursery classes offered more structured play with less didactic teaching from adult but more 'extending' of children's play. A further study of different types of pre-schools and the possible effects they have on child outcomes was conducted by Jowett and Sylva (1986) who also found differential effects on child outcomes.

In comparing school adjustment among children who either came from nursery or playgroup, Jowett and Sylva (1986) found that children who attended nursery were more 'ready' for school. The study observed 90 working class children at the start of school in two phases, the second six months later. Although the beginning of school was a more

relaxed term, the findings showed that the nursery children were more engaged in activities that stimulated problem-solving and purposeful, creative play than the playgroup children at phase 1. At phase 2, nursery children devoted less time to free play and opted more for formal 'educational' tasks than playgroup children who did not decrease their play. It appeared that purpose and task structure in pre-school may help children adjust to the formality of school life. The fact that nursery children chose to complete workcards and spent more time on self-initiated writing reflected their readiness for formal schooling. However, the study found that there were few differences between the two groups in conceptual attainment, with the exception of the language sub-scale on the Boehm Test.

2.3.2.3 Summary of the effects of interactive experiences in the day care environment

With reference to the overview of findings in tables 2.5 and 2.6, certain features of the day care environment are positively related to child development. In terms of type of interaction within the 'people' environment, it appeared that adult responsiveness, involvement and verbal communication help language development, social competence, prosocial behaviour and less behavioural problems. When adults supported learning, extended play and created 'scaffolds' in the learning environment, children appeared to perform better on cognitive and academic skills and had positive self concept. On the other hand, when adults were restrictive, controlling and less responsive, children had poorer performance in language and the adults created fewer opportunities for peer interactions. It has also been established that more verbal interaction with peers was related to more aggression and anxiety among children.

Research on curriculum and activities engaged by children in the day care environment

(refer to table 2.6), has identified certain features related to children's progress. In terms of cognitive and academic development, curricula that consisted of problem-solving and play activities, along with more conversations and more involvement in challenging tasks appeared to be more beneficial. A balance between free and guided choice, and between teacher and child initiated activities led to enhance prosocial behaviours, positive self competence and social acceptance, and school readiness. On the other hand, it appeared that delinquent behaviours and aggression were found in children from more didactic environments.

Table 2.5

Summary of Research Findings for the Effects of Interactive Features of Day Care on Child Development

Cognitive and Language Child Outcomes					
Study	Interactive Feature	Positive Child Outcome	Study	Interactive Feature	Negative Child Outcome
Rubenstein & Howes (1983)	Adult verbal stimulation in positive affective context	Better language performance	Rubenstein & Howes (1983)	Adult restrictiveness	Poorer language performance
Whitebook, Howes & Phillips (1989)	Teachers more responsive, sensitive and less detached	Better language development	McCartney (1984)	More peer interaction	More aggressive and anxious
Nabuco (1997)	Adults extend play, are supportive More incidence of 'scaffolding'	Better performance in reading, writing Positive self competence and perceived social acceptance			
Melhuish et al (1990b)	Caregivers communicate more and are more responsive	Better language development indicated by more word combinations			
McCartney (1984)	More functional utterances by adults Less adult controlling in communication More representational utterances by adults in group situations	Better language performance Children initiate talk with adults			
Hadeed (1994)	Caregivers more involved and supportive of learning More dialogue with adults	Better performance on cognitive assessments More socially competent Less behavioural problems			

Table 2.5 (contd.)

Summary of Research Findings for the Effects of Interactive Features of Day Care on Child Development

Social-emotional Child Outcomes					
Study	Interactive Feature	Positive Child Outcome	Study	Interactive Feature	Negative Child Outcome
Clarke-Stewart (1987)	More informative and explanatory sentences and more direction from teachers	Better social competence with peers	Tzelepis, Giblin & Agronow (1983)	Fewer adult-initiated contacts with children Less adult responses	Less peer interactions
Phillips, McCartney & Scarr (1987)	Higher amount of verbal interaction with adults	More considerate, sociable, intelligent and task oriented	Phillips, McCartney &Scarr (1987)	More verbal interaction with peers	More aggression and anxiety
Whitebook et al (1989)	Caregiver warmth Teachers sensitive and less harsh and less detached	Prosocial behaviour			
	Adults less likely to ignore children, responsive and intensive in interaction	Higher levels of play, purposeful activities, more securely attached to caregivers			
Anderson, Nagle, Roberts & Smith (1981)	Highly involved caregivers	Securely attached children			
Holloway & Reichhart-Erickson (1988)	High quality interaction with teachers	Prosocial responses[1]			

[1] Effect partialled out by social class

Table 2.6

Summary of Research Findings for the Effects of Type of Curricula and Task Activities on Child Developmental Outcomes

Study	Programme	Curricula/Task Activities	Child Outcome	
			Positive	Negative
Schweinhart, Weikart & Larner (1986); Schweinhart & Weikart (1997)	Distar	Teacher initiated activities		More delinquent behaviours
	High/Scope	Teacher and child initiated activities	More prosocial behaviours	
	Nursery school	Child initiated activities		
Nabuco (1997)	High/Scope	'Literacy-cultural' activities, pretend play, informal conversation in pairs or small groups More problem-solving activities Balance of free and guided choice	Better performance in reading and writing Positive self competence and perceived social acceptance	
	Formal Skills	Very little choice		
	Movimento da Escola Moderna	Majority of time spent in free choice		
Smith & Connolly (1986)	Structured activity Programme	More table activities	Increase in attention span over time Ready for formal school	Increase in aggression over time
	Free play programme	More group and fantasy play More physical activities	No increase in aggression	No increase in attention span

Table 2.6 (contd.)

Summary of Research Findings for the Effects of Type of Curricula and Task Activities on Child Developmental Outcomes

Study	Programme	Curricula/Task Activities	Child Outcome	
			Positive	Negative
Hadeed (1994)	Educationally oriented programme	More time spent in challenging tasks	Longer concentration span Higher intelligence score Fewer behavioural problems Positive self competence and perceived social acceptance	
	Care oriented programme	More adult-directed activities More time spent sitting and waiting		
Sylva, Roy & Painter (1980)	Playgroup	More time spent in free play and more adult led activities		
	Nursery school	More structured play, less didactic teaching More adults extending play		
Jowett & Sylva (1986)	Playgroup			Did not decrease in play at first year of school
	Nursery school		More ready for school Engaged more in problem-solving and purposeful and creative play in first year of school Attended to more formal educationally tasks	

2.3.3. Relationship between day care 'quality' and family background

Although many studies have established the effects of day care 'quality' on children's learning, it has been difficult to attribute this progress to day care alone. In examining these effects of day care variations, researchers have recognised the influence of the family environment that can contribute to child development. In most studies, analyses of the effects of day care 'quality' controlled for family background influences. Some studies have reported not only significant family influence on child outcomes but also a relationship between 'quality' of day care and family background. Much of this was found with social economic status indicators like parental income, parental occupation and mother's education (Vandell & Corasaniti, 1990; Dunn, 1993; Vandell, Henderson & Wilson, 1988), parental values (McCartney, 1984, McCartney, Scarr, Phillips, Grajek & Schwarz, 1982; Kontos, 1991) and degree of home stimulation (Lamb, Hwang, Broberg, & Bookstein, 1988; Lamb, Hwang, Bookstein, Broberg, Hult & Frodi, 1988).

With regards to social class, it has been discovered that parents who enrol their children in poor 'quality' centres came from backgrounds of poverty and stress (Howes & Olenick, 1986; Howes & Stewart, 1987). Parents who had lower education were less prepared to choose and pay for better 'quality' day care for their children (Phillips, McCartney & Scarr, 1987). In contrast, parents with more education and better jobs and from higher social class selected higher 'quality' centres (Kontos, 1991, Vandell, Henderson & Wilson, 1988).

Concerning parental values and attitudes, Holloway and Reichhart-Erickson (1989) found that mothers with children in high 'quality' centres had higher expectations for their

children's development. Kontos (1991) also discovered that parents who placed less value on social skills had children in higher 'quality' centres than parents who chose lower 'quality' centres. However, Phillips, McCartney & Scarr (1987) found that in Bermuda, parents who valued social skills enrolled their children in higher 'quality' centres whereas parents who valued conformity had children in lower 'quality' centres.

In an attempt to investigate the relationship between day care 'quality' and family environment, Bolger and Scarr (1995) used a wide range of family background variables. This large scale study involved 260 centres from three states: Virginia, Georgia and Massachusetts, and 636 children and their families. Bolger and Scarr hypothesised that family background would account for a substantial portion of centre 'quality' and that child care policies would mediate the influence of family characteristics on centre 'quality'. For example, state subsidies for parents may give the less advantaged parents access to better 'quality' day care and may weaken the relationship between centre 'quality' and family social economic status.

The results revealed that family background was significantly related to centre 'quality'. This was especially so in parental education in which higher educated parents chose better 'quality' centres. Also, it was found that authoritarian attitude in childrearing was associated with lower 'quality' centres. However, mother's intellectual level, parental stress and income were not related to centre 'quality'. With regards to the effects of state standards in regulation and child care subsidies, no significant influence was obtained. Higher 'quality' regulations did not reduce the relationship between centre 'quality' and family background. Instead, Bolger and Scarr noted that higher state 'quality' regulations

appeared to increase the 'quality' of average centres. The researchers suggested that this may have reduced the variance in 'quality' and raised the "floor" of 'quality'.

It is clear from Bolger and Scarr's study, that research on the effects of day care 'quality' must take family factors into account. Family background interacts with and mediates day care 'quality'. Some investigators have designed their studies to cater for this. However, results from these researches have been inconsistent; some studies found that together, family background and day care 'quality' (McCartney, 1984, Phillips, McCartney & Scarr, 1987) were significant variables of influence. However, some studies like Goelman and Pence (1987) and Kontos and Fiene (1987) found family background a stronger influence. Still some found day care 'quality' effects even after family background was controlled (Howes & Stewart, 1987).

2.3.3.1 Effects of day care 'quality' and family background on child developmental outcomes

Both variation of day care 'quality' and family background have been examined concurrently and established to be significant predictors of children's development. Parental value was used in Phillips, McCartney and Scarr's (1987) study of nine day care centres and 166 families. They discovered that parents who placed high value on social skills for their children and lower value on conformity selected higher 'quality' centres than the other parents. Investigations into the effects of both parental values and the 'quality' of day care on children's language development showed that these variables together were significant predictors language skills and social outcomes like considerateness and sociability.

Another study that found significant influence of both family background and day care 'quality' was a Montreal study of eleven day care centres by Schliecker, White & Jacobs (1991). The team investigated the effects of social economic status and family structure in relation to 'quality' on children's vocabulary. The study established that both centre 'quality' and SES significantly explained variance in children's language performance, with SES showing stronger influence. They also found that mother's age and centre 'quality' were positive and stronger influence for children from one-parent families than from two-parent families. This meant that children with older mothers and those who came from single-parent homes benefit more from higher 'quality' centres than children from two-parent homes. Therefore, the evidence from this study emphasised the importance of 'quality' care as a way of compensation for children from disadvantaged backgrounds.

Home environment was assessed in a study of Head Start children's developmental outcomes by Bryant, Burchinal, Lau and Sparling (1994). The study's main aim was to find out if the 'quality' of Head Start programme was effective in enhancing children's development when 'quality' of home was taken into account. An overall assessment of home 'quality' was used which measured language stimulation, organisation and schedule, use of punishment and family activities. It was found that mother's educational level and home 'quality' did not relate to classroom 'quality' measured by the ECERS. However, centres with higher classroom 'quality' had more children who performed better on achievement and school skills, regardless of home stimulation. But for performance on mental processing, it was discovered that 'quality' of classroom was more strongly related to the outcome for children who came from more stimulating homes. The results seemed

to suggest that the measure of classroom 'quality' was more sensitive to skills related to school. On the other hand, for intellectual performance on psychometric tests, it appeared that of stimulation children received at home played an important role as well as the 'quality' of classroom.

Dunn's study (1993) examined children's social adjustment in relation the 'quality' of day care and she found that both marital status of parents and 'proximal quality' of day care had significant influence on social adjustment. Children whose parents were married and were enrolled in classrooms that had variety and more flexible were rated as better socially adjusted. But other home background factors like parental income, maternal education and social class did not confound the effects of 'distal' and 'proximal' 'quality' of day care on children's level of social play and intelligence. This indicated that not all aspects of home background mediate the influence of day care 'quality' on child development.

There are other studies that have found significant and positive influence of day care 'quality' after family variables have been taken into account. One such study by Howes (1988) examined the influence of day care 'quality' on school success in which the effects of mother's work status, family structure and mother's education were considered. The results showed that after taking these family variables into account, day care 'quality' was still a strong predictor of academic skills for the boys. This was also the case with better school skills and low behaviour problems with both girls and boys.

Vandell, Henderson and Wilson's (1988) research also lent support to a day care 'quality' effect. These researchers found that family social class, which consisted of a composite

of maternal and paternal occupational status and education, was associated with 'quality' of day care. This meant that parents of higher social class selected better 'quality' centres for their children. When the effect of day care 'quality' were examined with the influence of family social class taken into account, 'quality' of day care significantly predicted social competence and positive affect in children. Children in higher 'quality' centres were found to spend more time in friendly interactions and less time in unfriendly interactions. It was also established that children from poorer 'quality' care received more 'shy' nominations from peers after home background was considered.

Not all studies obtained significant longitudinal effects of day care 'quality' or concurrent effects of centre 'quality' and family background. For some studies, home background appeared to have partialled out effects of day care 'quality' and shown to be the stronger predictor of child outcomes. Kontos and Fiene's (1987) study of Pennsylvannia day care centres investigated the relationship between 'quality' day care and family background variables and their effects on child outcomes. Family background was represented by mother's education, use of child care subsidy and maternal value for prosocial behaviour. Their findings indicated that mother's education and value for social behaviour emerged as significant predictors of cognitive and language development partialling out the effects of day care 'quality'. On the other hand, mother's education and centre 'quality' (as measured by a state licensing assessment) emerged as concurrent predictors of social adjustment. This meant that children with more educated mothers and in higher 'quality' centres had fewer social problems.

The Victoria Day Care Project by Goelman and Pence (1987, 1988) also demonstrated

support that family background was a stronger influence on language development than 'quality'. The project used family structure and maternal education as predictors of language development in children. On examining the effects of family structure, there were differences (approaching statistical significance) between the language performance of children from two-parent families and one-parent families. With regards to maternal education, significant effects were found favouring children with more educated mothers. However, a regression analyses indicated that centre 'quality' was not a significant predictor of language development. One possible reason was that there was not much variability among the day care centres and that the mean 'quality' score measured by the ECERS was 4.62 which was above minimal 'quality' rating. This may mean that a threshold of 'quality' was reached and the effects were not of substantial compared with family background variables.

The 'quality' of home as reflected by the amount of stimulation available at home was examined by Hwang, Broberg & Lamb (1992) in their Swedish study of child care. Intellectual competence was found to be significantly predicted by 'quality' of home care and the sociability of the child but this was not found with 'quality' of alternative care. This was different with assessment of personality, as it was found that more mature children came from homes that were more stimulating, had more social support, fathers who were more involved and also from higher 'quality' alternative care.

The study of day care 'quality' in Bermuda followed up children at intervals of ages five, six, seven and eight by Chin-Quee and Scarr (1994). Of the original 166 children, 127 were assessed using semi-annual evaluations by report cards. Teachers in primary grades

from one through four rated students on peer relations, cooperative behaviour and academic achievement. These outcomes were regressed on maternal education, IQ, parental values (which were conformity and social values), child care experience and 'quality' of day care. The results revealed that ECERS rating of 'quality' did not predict any of the child outcomes but instead maternal IQ and values of conformity (negative predictor) and social skills were significant predictors. Similar results were obtained when verbal interaction was used as a predictor of 'quality'. This seemed to suggest that 'quality' day care effects, which were obtained at the start of this study (McCartney et al, 1982) disappeared at school age but family influences continued to be important. This suggested that the 'quality' of current environments may be more important in enhancing child progress, as evident by continual family influences. However, it would be useful to examine the 'quality' of school-aged environments to establish the effects of consistent 'quality' care and education for children. Chin-Quee and Scarr's study is good news for parents who have misgivings about long-term effects of non-parental care per se.

Although type of care and not 'quality' of care was examined in their study, Melhuish et al (1990a) reported the strong influence of mother's education on children's cognitive development. The study found that type of care was related to cognitive development in children. However, in their rigorous analyses that took into account pre-test, child characteristics and mother's education, the results no longer showed that type of care was influential. Instead, mother's education significantly predicted cognitive performance. However, this pattern of results was not found for language development.

2.3.3.2 Summary of the effects of day care 'quality' and family background

There is a mixture of results in investigations into the concurrent effects of day care 'quality' and family background. Table 2.7 shows a summary of these findings, some establishing that both variables are influential, some found a stronger influence from day care 'quality' alone and others reporting family background as a stronger factor in enhancing child development. With reference to the studies cited, there is a possible pattern in the findings. It appears that where family background was found to be a stronger predictor, mother's education appeared to be a consistent and significant influence in enhancing cognitive and language development. This variable was shown to have partialled out the effects of attending day care or the 'quality' of day care (Melhuish et al, 1990a; Kontos & Fiene, 1987; Goelman & Pence, 1987).

Where day care 'quality' remained the stronger predictor compared with home background, it appeared that the particular 'quality' measures which have been used may make a difference in results. On examining the studies cited in table 2.6, the researchers (Howes, 1988; Dunn, 1993; Vandell, Henderson & Wilson, 1988) used composite measures consisting of structural and process features in the day care setting. One may speculate that these are more specific and quantifiable features of 'quality' and may therefore be more sensitive in measuring environment thereby partialling out any influence from family background.

This mixture of findings is cause to be cautious in taking into account the effects of day care and family separately. The results suggest that both variables were found to be significant factors of influence and that the two educational and care settings were

related. This underlines the importance of adopting a broader perspective in which the ecology of children's educational and care environment is considered (Bronfenbrenner, 1979; Katz, 1994.) Empirical investigations should continue to weigh the effects of day care 'quality' against the effects of the family environment (Melhuish, 1991b).

Table 2.7

Summary of Research Findings for the Effects of Relationship between Day Care 'Quality' and Family Background on Child Development

	Effects of both Day Care 'Quality' and Family Background		
Study	'Quality' Measure	Family Background	Child Outcome
Phillips, McCartney & Scarr (1987)	ECERS	Parental value: higher on social value and lower conformity	Positive language skills More considerate and sociable
Schliecker, White & Jacobs (1991)	ECERS	Higher social economic status Family structure	Higher performance on language Higher performance on language (one-parent families)
Bryant et al (1994)	ECERS	More stimulating homes	Positive mental processing skills
Kontos & Fiene (1987)	Child Development Program Evaluation-Indicator Checklist	Mother's education	More socially adjusted
Hwang & Broberg (1992)	Belsky & Walker Checklist	More social support, fathers involved, and more stimulating homes	More maturity
Dunn (1993)	'Proximal quality' : classrooms with more variety and less limits	Married parents	More socially adjusted

Note. Shaded areas show independent variables that are partialled out in the analyses.

Table 2.7 (contd.)

Summary of Research Findings for the Effects of Relationship between Day Care 'Quality' and Family Background on Child Development

		Effects of Day Care 'Quality' More Significant	
Study	'Quality' Measure	Family Background	Child Outcome
Dunn (1993)	'Proximal quality': classrooms with more limits	Family income	Higher level of social play
	'Distal quality': trained caregiver and less classroom experience and ECERS high 'quality	Social economic status Maternal education	Higher verbal intelligence
Howes (1988)	Composite measure of staff training, group size, adult-child ratio, programme and physical space	Mother's work status Family structure Mother's education	Higher academic skills for boys Higher school skills and lower behaviour problems for boys and girls
Vandell, Henderson & Wilson (1988)	Composite measure of caregiver training, materials, adult-child ratio and group size	Family social class: composite of maternal and paternal occupational status and education	Higher social competence More positive affect More time spent in friendly interactions
Bryant et al (1994)	ECERS high 'quality'	Home stimulation	Higher achievement and school skills

Table 2.7 (contd.)

Summary of Research Findings for the Effects of Interaction between Day Care 'Quality' and Family Background on Child Development

		Effects of Family Background More Significant	
Study	'Quality' Measure	Family Background	Child Outcome
Melhuish et al (1990b)	Type of Care	Higher mother's education	Positive cognitive performance
Kontos & Fiene (1987) Kontos (1991)	ECERS 'Quality'	Higher mother's education Parental value of prosocial behaviour	Positive cognitive and language development
Goelman & Pence (1987, 1988)	ECERS 'Quality'	Higher maternal education	Positive language development
Hwang, Broberg & Lamb (1991)	Belsky & Walker Checklist	'Quality' of home	Positive intellectual competence
Chin-Quee & Scarr (1994)	ECERS 'Quality'	Higher maternal IQ Lower value in conformity	Better social skills

Note. Shaded areas show independent variables that are partialled out in the analyses.

2.4 Summary of research review

The effects of centre care attendance per se was reviewed and general findings showed that for the children who came from disadvantaged background, pre-school experience was beneficial for their development (Schweinhart et al, 1993; Schweinhart & Weikart, 1985; McKey et al, 1985; Lee et al, 1990; Burchinal, Lee & Ramey, 1989; Lazar & Darlington, 1980). The general pattern of results was that pre-school experience, half or full day, compensated for children's lack of support from their social and economic home background. However, findings were mixed where low/moderate risk children were concerned as both negative and positive findings have been obtained (Larsen & Robinson, 1989; Rubenstein, Howes & Boyle, 1981; Melhuish et al, 1990a; Clarke-Stewart & Gruber, 1984; Osborn & Milbank, 1987; Goelman & Pence, 1987; Thornburg et al, 1988; Vandell & Corasaniti, 1990).

Research that looked specifically at the 'quality' and conditions of the day care environment, in general showed that higher 'quality' day care was related to enhanced child development (McCartney, 1984; Dunn, 1993; Kontos, 1991; Beller et al, 1996; Howes, 1990; Bryant et al, 1994). Where no pre-school effects have been established, some studies reported significant intervening variables from the home that may have partialled out the day care effects (Kontos & Fiene, 1987; Goelman & Pence, 1988; Hwang, Broberg & Lamb, 1992; Chin-Quee & Scarr, 1994). Others indicated that global 'quality' alone was not enough to explain developmental progress. Studies have also identified specific interactive features in the curricula and the type of social involvement which were related to child development (Whitebook, Howes & Phillips, 1989; Melhuish et al, 1990a, 1990b; Hadeed, 1994; Nabuco, 1997; Jowett & Sylva, 1986; Holloway &

Reichhart-Erickson, 1988).

In general, research findings that involved concurrent investigations into the effect of day care 'quality' and family background suggested that the two educational and care environment should not be studied separately as they are related. Therefore, this study explored the characteristics of the day care environment which may be important in encouraging progress in children. However, confoundment of the possible effects is predicted, especially in the Singapore context as there is an increasing interest among parents to give their children a headstart in school. It is not uncommon for them to enrol children in extra classes like speech, reading, drama, computer, after attending a pre-school programme or at the weekends. Parents also work with children frequently using published school workbooks and readers to help their children be ahead in school (refer to appendix C). This study aims to add to the current literature on the way the home environment may confound the effects of the day care environment on children's development.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

Given the growing demand for day care provision for young children in Singapore and the rapid increase of day care centres discussed in chapter one, the main aim of this study was to investigate the possible influence of the day care environment on children's development . Empirical findings, surveyed in chapter two, has shown that specific aspects of the day care environment are related to child outcomes. Results, in general, show that global 'quality' of the day care environment and the interactive experiences within it have positive effects on language and social-emotional development among low risk children. However, the findings from investigations into these effects with family background taken into account appear to be mixed. This study attempted to contribute to this literature based on data collected in the Singapore context.

The following sections describe the design of this project and includes the research hypotheses, the phases of data collection, the sampling design and a description of the samples used. This is then followed by a review of the research instruments administered in this study which includes the pilot study. Finally, the chapter reports on the validation of the ECERS in Singapore and initial findings of the characteristics of day care centres in Singapore.

3.2 Research design

The aim of this research was to investigate possible environmental variations of day care

centres in Singapore and to examine how these variations may influence the developmental progress of 4-6 year old children. The sampling design is discussed in section 3.2.3.

The explanatory (predictor) variables in this design consisted of two aspects of the day care environment. The first aspect involved the physical and programmatic characteristics of day care centres and were measured by the Early Childhood Environment Rating Scale, ECERS (Harms & Clifford, 1980). The second aspect consisted of the interactive experiences in the day care centres which were child behaviours related to task and peers. These were measured by the Target Child Method of Observation, TCM (Sylva, Roy & Painter, 1980).

The response (outcome) variables in this study consisted of language and social-emotional outcomes obtained from the pre-school children. These outcomes were measured by a battery of instruments that were well-used in studies of pre-school effects. These instruments are discussed in section 3.3. The children were pre-tested at the beginning of the school year to obtain baseline data and a post-test was administered nine months later at the end of the school year.

Information relating to children's 'IQ', parental characteristics and home environment was also collected to control for any possible confounding of the effects of the day care environment on children's progress. For statistical analysis, the outcome scores from the response variables were examined in relation to the explanatory variables which consisted of various characteristics of the day care or the home environment.

3.2.1 Research hypotheses

The study was organised in phases and aimed to investigate the following research hypotheses:

Research Hypothesis 1:

It is predicted that the physical and programmatic characteristics of the day care environment, measured by the ECERS, will be associated with pre-school children's linguistic and social-emotional progress over the school year after taking home background into account.

Research Hypothesis 2:

It is predicted that there will be significant differences in interactive processes such as task involvement and social interaction within the day care environment, measured by the TCM, between centres in which children made 'high' and 'low' linguistic and social-emotional progress after taking children's home background into account.

3.2.2. Phases of data collection

This research spanned over a school year in which the main programme began in January and ended in December. However, during the months of June, November and December, a special holiday programme was conducted which did not include academic lessons to cater for those children on holiday with their parents.

The ECERS was administered before the beginning of the school year, in order to validate the instrument for use in Singapore. It was also administered first to establish physical and

programmatic variations among the day care centres.

In order to allow children and teachers to settle in the centres, pre-tests were administered two weeks after the start of school. Post-tests were administered nine months later to obtain progress scores. Systematic observations of child behaviours were made during the period between the pre-tests and post-tests phases. It can be said that this period of the pre-school year was used as a 'natural' treatment in this research design.

The following describes the steps that were taken under each phase of the research project. Phase one was conducted between September and November, 1994. Day care centres and children were sampled and this is described in section 3.2.3. Letters were sent to the centres' director/supervisor and parents to obtain their consent (see appendices D and E). The training of two observers to use the ECERS was also conducted to obtain inter-rater reliability. This is reported in section 3.4.2.1. Child outcome assessments were also piloted during this phase.

Phase two of the project was conducted between mid January and February 1995. Pre-tests were administered and completed by mid February and the remaining time was used to administer these assessments on some children who were off school either sick or on holiday during the main period of pre-assessment. During this phase, training to use the Target Child Method of Observation was conducted and inter-rater reliabilities established. This is reported in section 3.4.2.2. Demographic questionnaires relating to home background were mailed to parents.

Phase three was conducted between March and May 1995. Systematic observations of child behaviour were made in the centres.

Phase four was conducted between end August and September 1995. Post-test data was collected to measure the progress made during the school year.

3.2.3. Sampling design

This section describes how the main sampling units, day care centres and children, were obtained and some demographic information about these sampling units and the centre staff involved.

3.2.3.1 The day care centres

As the main intent of this study was to investigate the effects of possible environmental variations of day care centres in Singapore, a stratified random sampling procedure was used to ensure variation among the centres. This was done by using two expert judges to stratify the population of 329 daycare centres in Singapore into what they would consider to have 'high' and 'not high' standard of provision. It was the intention of this project to randomly select ten centres from each of the two groups.

Two early childhood specialists were approached to stratify the day care centres. The experts had 14 and 20 years of experience in the pre-school field in Singapore. They are currently involved in pre-school teacher education and have made numerous supervisory visits to day care centres in Singapore.

The experts were asked to list the criteria (refer to appendix F for the complete list) according to which they would assess the effectiveness of provisions in day care centres. They then independently categorised as many of the 329 centres as possible into either 'high' or 'not high' in 'quality'. Out of the 329 centres, 39 centres were known to both experts. This meant that they are familiar with their curriculum, teaching practices, physical provisions, staff and general running of the centres.

Using the two main categories, 'high' and 'not high', the percentage agreement index was calculated as follows:

Agreement / (Agreement + Disagreement)

32 / (32 + 7)

0.82 or 82%

Out of the 32 centres, 10 centres were judged by both experts to be of 'high' and 22 were judged to be 'not high'. As the target sample size for this research was originally 20, 10 from each category, all 10 under the 'high' category were selected. Ten out of the 22 'not high' centres were randomly chosen and approached to obtain access.

Most of the day care centres in Singapore can be categorised according to the following types of administrative bodies:

Workplace centres

Private individuals/entrepreneurs

Religious/cultural institutions (e.g. churches, mosques, temples, Chinese clans)

Organisations (e.g. YWCA, YMCA, National Trade Union Congress)

Government (People's Association)

Social welfare/services (e.g. Presbyterian Welfare Services)

The 10 'high' centres selected by the experts consisted of four workplace centres , three private centres, two religious centres and one run by an organisation. All the centres were approached for their co-operation and nine were found suitable for this research. One private centre, although willing to participate, had a population of 99% Japanese children and was therefore inappropriate for the study.

With the 22 'not high' centres, to achieve representativeness of administrative categories, proportionate random sampling was used to select the 10 centres for the study. Out of the 22 centres, three were privately run, ten were run by organisations, six were government-run and three were run by social services. To get a proportionate sample from each category, the number of centres in each of these were divided by the total number of centres, that was, 22. This was then multiplied by 100 to give the proportionate number of centres to be sampled from each category. This resulted in randomly selecting one centre each from private and social service groups, five from organisations and three from government centres. The 10 centres were approached and accessibility was granted. Table 3.1 shows the procedure in which proportionate random sampling was done.

Table 3.1

Proportionate Random Sampling of Day Care Centres

Administrative Category	Number of Daycare Centres	Procedure for Proportionate Random Sampling	Proportionate Number of Day Care Centres
Private	3	(3÷22)x100	1.0
Organisations	10	(10÷22)x100	5.0
Government	6	(6÷22)x100	3.0
Social service	3	(3÷22)x100	1.0
Total	22		10

To sum up, although the intended total of number of research centres was 20, 16 centres were confirmed for this research. This was because one centre (from 'not high' category) was found unsuitable as it consisted of Japanese children. The other reason was that, after considering time scale and management of the whole project, three other centres (one from 'high' and two from 'not high') had to be randomly dropped for practicality and economy. This resulted in 16 confirmed research centres, eight centres from 'high' and eight centres from 'not high' categories.

3.2.3.2. The children and their home background

Singapore has a population of about 2.8 million with 77.6% consisting of Chinese extraction, about 14% of Malay origin, about 6.7% of Indian origin and 1% of mixed heritage. Of the total population, 4.5% consists of children under five years of age (Yearbook of Statistics Singapore, 1992). Pre-school provisions consist mainly of 'kindergartens' and day care centres and are licensed by the Ministry of Education and Ministry of Community Development respectively. 'Kindergartens' provide three-hour sessions of structured academic curriculum. Day care centres, in addition to providing an academically oriented programme for children, also operate for longer hours (7am - 7pm)

to care for children while parents are at work. In both types of pre-schools, the classes are organised into age groups consisting of 'toddlers/infants' (children under three years of age), 'nursery' (3-4 years olds), kindergarten 1 or K1 (4-5 year olds) and kindergarten 2 or K2 (5-6 year olds).

For this study, one class (either K1 or K2) from each centre was randomly selected and eight children from each centre were randomly chosen for developmental assessment. Letters were sent home with the children to obtain parental consent and a total of 128 children were confirmed for this study by the start of phase one. However, by the end of phase two, six children dropped out of the project because their parents decided to withdraw them from the day care centres and as this occurred during the end of the pre-test stage, no replacements were sought.

In all, the participants in this project comprised of 122 children (70 boys and 52 girls) from seven K1 classes, seven K2 classes and two mixed classes, out of which 60 children were from K1 age group and 62 children from K2 age group. There were fewer girls than boys in the sample because some centres had more consent from parents who had sons. The age range of K1 children was between 49-60 months with a mean age of 53.78 months and the age range of K2 children was between 58-72 months with a mean age of 65.85 months. The total mean age of all 122 children was 59 months. Figures 3.1 and 3.2 illustrate the characteristics of the groups.

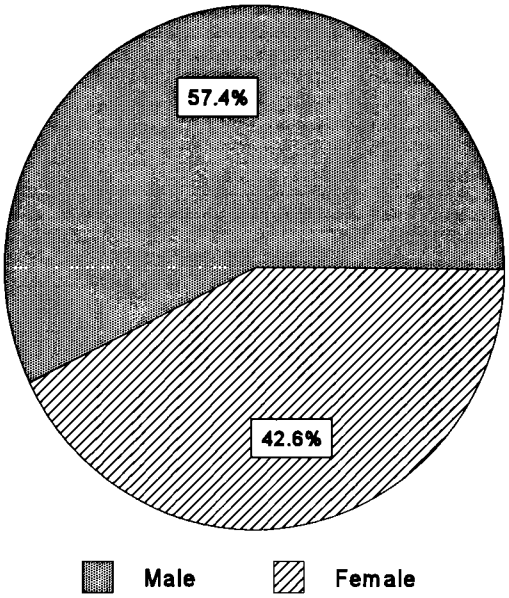


Figure 3.1. Percentage of gender type among children

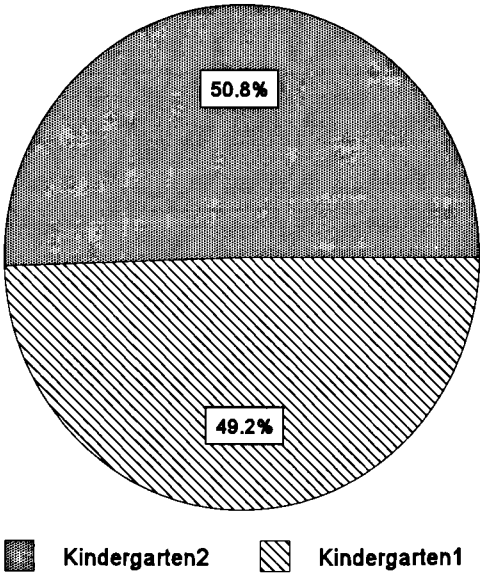


Figure 3.2. Percentage of class type among children

In relation to language used in this study, children who were not proficient in English were not recruited to the study. This was because most of the developmental assessments were administered in English. During the process of sampling, this researcher encountered only one child who had just arrived from China and did not understand English. In general, pre-school children in Singapore are able to understand and speak English at adequate levels as English is used as the language of instruction. Between a quarter and half of the curriculum time is also given another language like Mandarin, Malay or Tamil (Sharpe, 1994). Although all children are able to communicate in English in the day care centres, the type of language spoken at home is varied and may influence this ability. Therefore, information was collected on the language used at home to control for this possible influence.

In this study, parents were asked what language their children would normally use with them at home. It was found that 45 (36.89%) children were bilingual, that is, use both English and a Chinese language, 49 (40.16%) spoke English only at home and 28 (22.95%) spoke a Chinese language at home. Figure 3.3 illustrates this description. In relation to ethnicity, this project selected Chinese children with the exception of two who were of mixed heritage. One child had a Chinese father and English mother and the other had a Indian father and Chinese mother. This was done because Singapore has a multicultural population and therefore it was possible to have confounding effects from ethnic culture on children's developmental progress. It is hoped that investigations of this kind will be conducted in comparing progress of various ethnic groups in the future.

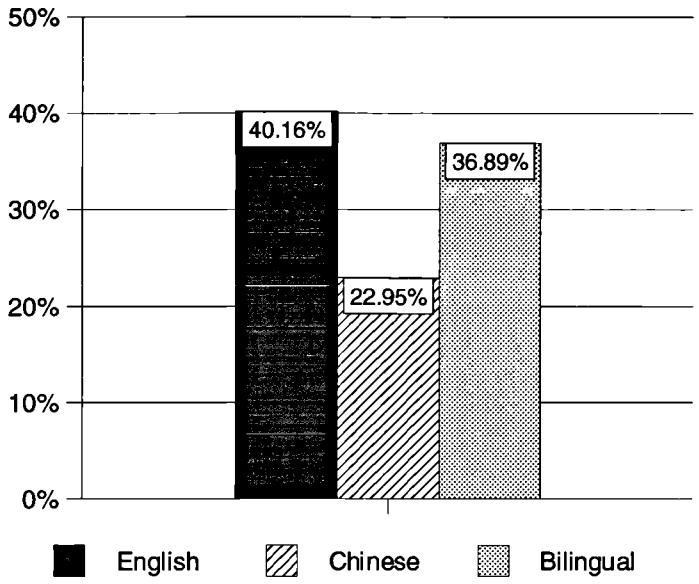


Figure 3.3. Bar chart of type of language spoken at home among children

The age of mothers involved in this research ranged between 26 to 47 years with a mean of 36 years. All the mothers worked full-time with 92 of them (76.03%) non-graduates and 29 (29.97%) graduates. The age of fathers ranged between 28 to 48 years with a mean of 39 years. There were 37 (30.58%) fathers who were graduates and 84 (69.42%) were non-graduates. All the children live with both parents, except for two children, one whose parents were divorced and living with the mother and the other whose father was deceased.

With reference to figures 3.4 and 3.5, majority of the fathers had administrative, managerial or executive jobs (39.3%) with professional (22%) and sales and service (20.5%) following. The 'others' category consisted of self-employment, homemaker or student. In contrast, the majority of the mothers were in clerical jobs (35.2%) with

professional and administrative, managerial and executive following (23.8% each).

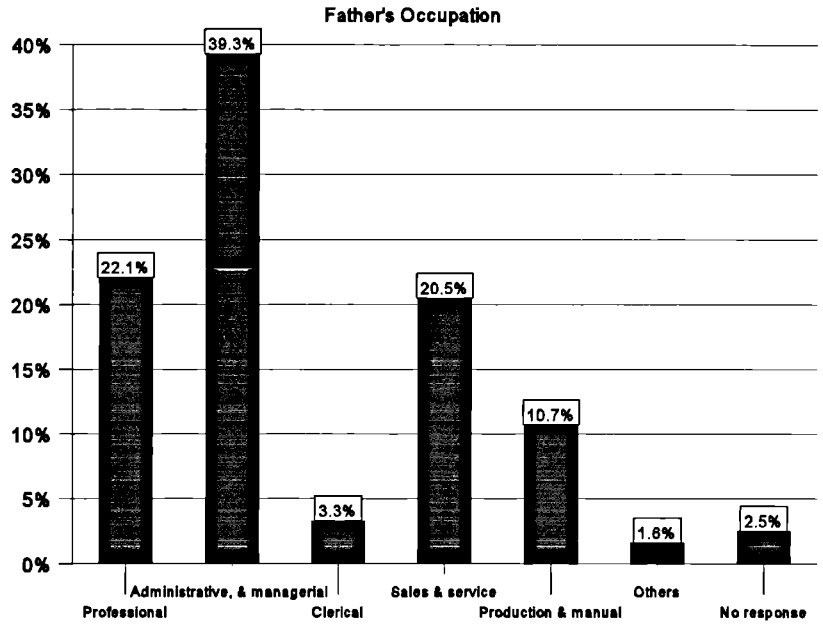


Figure 3.4. Bar chart of father's occupations

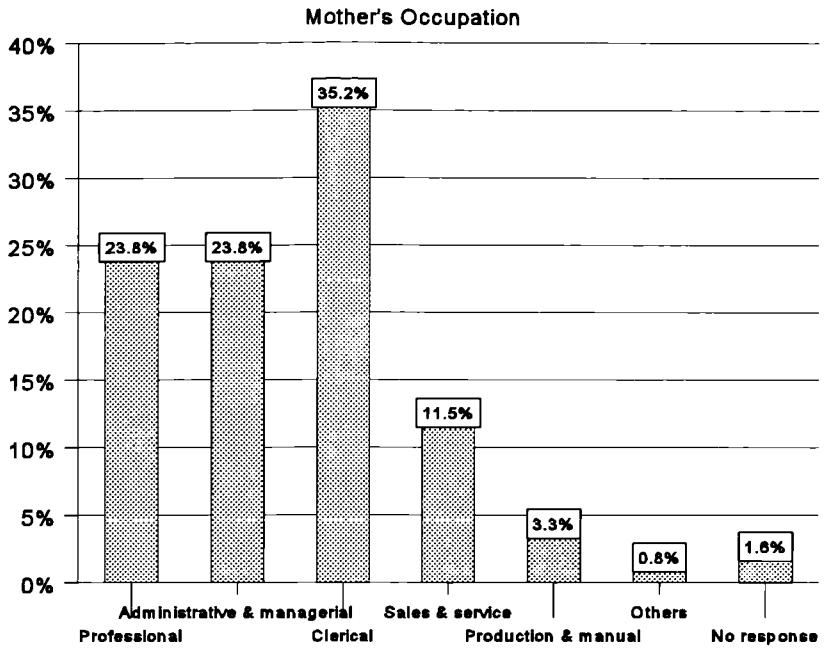


Figure 3.5. Bar chart of mother's occupations

For this study, an index of social economic status (SES) was not used as a control variable but instead mother's education was included in the analyses. This inclusion was based on results of existing research that mother's education is a stronger predictor of children's development progress (Melhuish et al, 1990a, 1990b; Kontos & Fiene, 1987; McCartney, 1984; Howes, 1988). Also, the project had difficulty in obtaining information on parental income which was one of the indices in calculating the SES of each family. Based on consultation with supervisors and on this researcher's experience, the reported parental occupation was considered not an accurate indicator of SES because job designations were used in a very broad sense.

3.2.3.3. The centre staff

The sampling unit in this study was both the centre (N=16) and the children (N=122). In all, 56 staff members were involved, of which 16 were supervisors. In each class, there was an English speaking teacher, who was usually the main teacher, and a Chinese language teacher. In some centres, there was a permanent assistant teacher in each class and in others, the assistant teacher was shared (a floater). Of the 16 centres, two had supervisors who were teachers also. In terms of ages, 23 (41.07%) of the staff were between 21 and 29 years of age, 22 (39.29%) were between 30 and 39 years of age and 11 (19.64%) staff over 40 years of age. Please refer to figure 3.6. In all, 51 of the staff members were trained in basic early childhood education, two had specialist training at degree level and three were untrained. Please refer to figure 3.7.

With reference to figure 3.8, the majority of the staff (64.29%) had between one and five years of working experience, followed by 14.29% of staff with between six and ten years of experience. and six members (10.71%) with 11 to 20 years. With regards to level of formal education, most of the staff had either 'O' level (44.63%) or 'A' level (30.36%). This was followed by degree holders (14.29%) and the least number of staff were with either secondary or postgraduate level of education (5.36%).

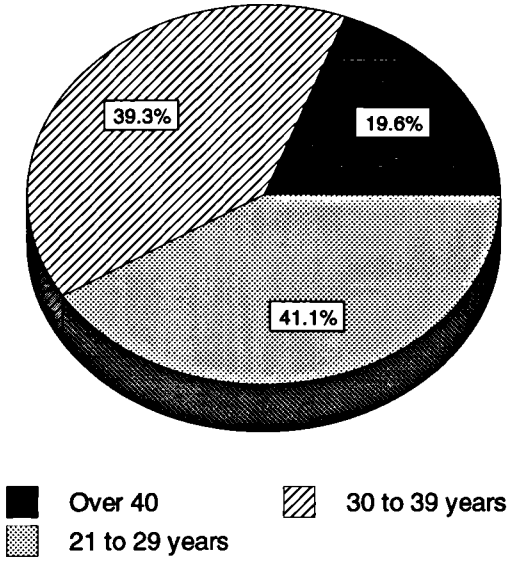


Figure 3.6. Pie chart of staff's age groups

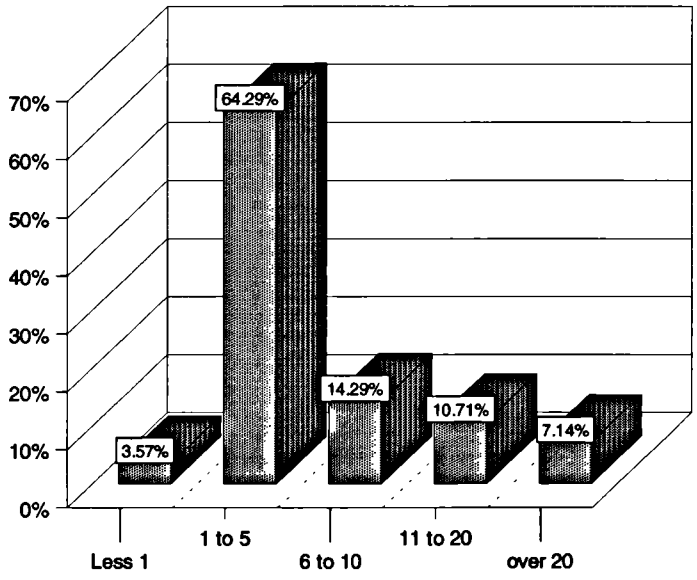


Figure 3.7. Bar chart of staff's number of years of working experience

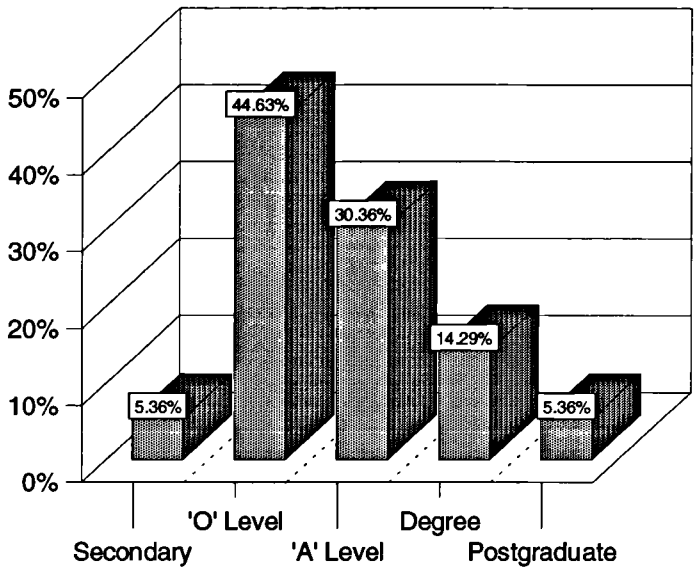


Figure 3.8. Bar chart of staff's formal education level (N=56)

3.3 Research instruments

The selection of research instruments was guided by the following criteria. The instruments were chosen for their frequent use by researchers investigating the effects of pre-school and found to be useful. The instruments were reported to have adequate validity and reliability by their authors. They were also chosen for their age-appropriateness and cultural adaptability, preferably they have already been used in Singapore.

This section describes the research history of the instruments, how they were administered and their validity and reliability. This also includes a description of how some researchers have used the assessments for their studies.

3.3.1 Measuring the day care environment

In selecting instruments to measure the day care environment, two methods of data collection were used: rating scale and systematic observation. The rating scale, Early Childhood Environment Rating Scale, was used to measure the broad physical and programmatic characteristics of day care centres. The advantage of using this rating scale was that it was easy to score and quantify; therefore it served the needs of research that was limited by time and funding. Another advantage was that it enabled the researcher to obtain a broad profile of physical and programmatic provisions offered by each day care centre. The information provided a compact and composite profile of the day care centres in the study. However, there were disadvantages to this method and this is discussed in section 3.5.1 which describes how this study attempted to reduce bias in data collection.

The second method of measuring the day care environment involved systematic observations. It was the purpose of this study to obtain a description of child-involved activities in each day care centre and therefore this phase required more detailed observations. The advantage of using systematic observations was that categories of behaviour were predetermined which allowed the ease of coding and provided a structure which observers were required work within. This reduced the chances of deviation during observation and observer bias. Systematic observations also allowed data collected to be quantified for statistical analysis as frequencies of types of behaviour in each day care centre were noted. The Target Child Method of Observation (Sylva, Roy & Painter, 1980) was used in this phase of study. The following describes the two research instruments used in measuring the day care environment.

3.3.1.1 Early Childhood Environment Rating Scale

The purpose of using this rating scale was to create a profile of the 16 selected day care centres and explore variations in the general provisions of these centres. The Early Childhood Environment Rating Scale (ECERS) is a 7-point rating scale that consists of seven subscales relating to the overall environment of the pre-school setting. Please refer to appendix G for an example of the scoring form. These subscales include *personal care routines, furnishings and display, language-reasoning experiences, fine and gross motor activities, creative activities, social development* and *adult needs*. Observers are required to rate the classroom setting on a scale of 1 (inadequate) to 7 (excellent) with a score of 3 denoting 'minimal'. Observable descriptions are provided at scores 1, 3, 5 and 7.

The authors of the ECERS used two methods of validating the scale. Seven experts were

asked to rate the importance of each item and a 78% agreement among the experts was achieved (Harms & Clifford, 1982). To further establish its validity, ratings of trainers working with teachers of the classrooms were correlated with the ratings of child development professionals and non-professional observers and a rank order correlation of 0.74 and 0.70 was obtained respectively. In addition to validity, the authors obtained an inter-rater reliability of 0.88 and a test-retest reliability of 0.96.

Many studies in the effects of pre-school environment have used the ECERS to obtain a global score of 'quality' used as a predictor of developmental outcomes. In Phillips, McCartney and Scarr's (1987) study of the Bermuda day care centres, ECERS was used to assess 'quality' of child-care environment and they found that 'quality' on ECERS predicted children's social development. They reported an inter-rater reliability of 0.82 across all items. Howes, Phillips and Whitebook (1992) reported a median inter-rater reliability of 0.91 on using the ECERS for different cohorts of centres. Kontos and Dunn (1993) obtained a reliability of 0.92-0.94 in their study of caregiver practices and beliefs and Hadeed (1994) established a reliability of 0.80 in her study of Bahrainian pre-schools. This brief summary shows that ECERS has been used successfully in many different countries.

This study has adopted the ECERS as it is a well-used instruments in the study of pre-school effects. The designers and users of the ECERS have reported on adequate validity and reliability. The ECERS has also provided more stringent guidelines in its use. For example, the authors included observable descriptions for four of its seven ratings as guides and "notes for clarification" to lessen ambiguities. The ECERS's flexibility in

obtaining either a global score or subscale scores for centre is an advantage for its practical and informative value . The validation of the ECERS for use in Singapore is reported in section 3.5.1 of this dissertation.

3.3.1.2 Target Child Method of Observation

The Target Child Method (TCM) of observation arose from the Oxford Pre-school Research Project, directed by Jerome Bruner (1975-1978), that looked into pre-school practices in Britain. This method, systematic observation, allowed the researcher to focus on each child's behaviour in relation to the tasks at hand as well as interaction with peers or adults. Observations were narratively recorded within block intervals of time. Observations can be coded under four categories:

1. Task codes that describe what the child was doing within each time interval
2. Social codes that describe the child's social interaction or lack of it.
3. Language codes that showed who spoke to whom and what was it about.
4. Adult involvement codes that showed the type of adult interaction with the child. (This category was included by Sylva, Smith & Moore in 1985, Monitoring The High/Scope Training Programme.)

The Target Child Coding Manual (Sylva, Roy & Painter, 1980) provided an extensive list of codes under each category (refer to appendix H). For this study, task and social codes were used to test the hypotheses that there are differences in task involvement and social interaction between children who made higher progress and children who made lower progress.

The Oxfordshire project sampled from three types of pre-schools; 120 children in all with age ranging from three and a half to five and a half years. Each child was observed for two twenty-minute sessions with 30-second intervals. Using the kappa statistic, Sylva and her team reported a range of inter-rater reliabilities from 0.75 to 0.92.

Other researchers like Hadeed (1994) used the TCM to compare two types of pre-schools in Bahrain: care oriented and the educationally oriented pre-schools. This study observed 12 children from each of the ten pre-schools (five pre-schools from each type). For reliability, Hadeed reported a range of kappa coefficients of 0.91 to 1.0 based on a sample of ten children and a range of 0.83 to 0.97 based on a video recording of seven children. Another study by Nabuco and Sylva (1995) compared the effects of three types of pre-school curricula: the High Scope, Formal Skills and Movimento da Escola Moderna in Portugal. The TCM was used to obtain "process variables" in each of the pre-school curricula to make comparisons of its effects on child learning. The researchers reported on an inter-observer reliability range from 0.86 to 0.98 (kappa coefficients).

The TCM is well used in many countries like Britain (Jowett & Sylva, 1986), Bahrain (Hadeed, 1994), Portugal (Nabuco & Sylva, 1995) and Italy (Aureli & Prococci, 1992). The system is flexible and adaptable for use in different cultures. Data collected characterised the type and frequency of child behaviour in each centre and therefore helped to describe aspects of the environment which the ECERS might miss.

3.3.2 Measuring cognitive and language development

A battery of tests was selected to assess cognitive and language outcomes among the pre-

school children. Cognitive development in the form of 'IQ' was measured by the Short-form IQ tests taken from the British Ability Scales, BAS (Elliott, 1983). The scores were used as baseline data. Subscales from the 'Retrieval and Application of Knowledge' section of the British Ability Scales were used to assess language progress among the children. All tests were administered at pre-test and post-test except for the short-form IQ.

The BAS consists of 23 scales that measure a range of cognitive abilities. It has been standardised on a representative sample of children between ages two and a half to seventeen and a half years of age in Great Britain. The scales provided a range of tests that include a scholastic attainment measure which was not found in most intelligence test batteries. The author, Elliot (1983), used internal consistency, scorer and test-retest/alternate-form to establish reliabilities on individual scales. An internal consistency was conducted and this obtained a coefficient range of 0.70 to 0.98 for the various subscales. The "average reliabilities for the General, Visual, Verbal and short-form IQs were in the range of 0.90 to 0.95, indicating that all the IQ measures are of high reliability" (Elliott, 1983, p. 94). Intra-class correlations were obtained between scorers and a range of 0.62 to 0.72 was established. The third type of reliability, test-retest/alternate-form reliability, was conducted using ten trainees educational psychologists and 60 children and a coefficient of 0.95 was obtained for the General IQ score.

As the subscales can be used independently and with short-form versions available, the BAS was useful for this study's time frame. The BAS was also piloted and used in a

comparative study of stress in Singaporean and British expatriate children by Betts (1991). The children were tested in English and the researcher found the tests easy to use with the Singaporean children, with minimal problems.

3.3.2.1 BAS: Short-form IQ

The short-form IQ test consisted of 'naming vocabulary', 'matrices', 'similarities' and 'recall of digits'. The aggregate score from these four subtests reflected the current intellectual ability of children. Scores obtained were used as baseline data in statistical analyses reported in chapter four of this dissertation. The 'naming vocabulary' was a 20-item task that required children to name certain objects around them or from pictures. This task assessed children's ability to recall from long term memory. The 'matrices' subtask presented children with a matrix problem to complete and this provided a measure of reasoning ability. The third subtest, the 'similarities' task, provided children with three words, for example, "apple, orange, banana" and they were required to name something else that would go with these three items. This provided a measure of verbal reasoning in which children were required to focus on the precise class to which the items belong. The last subtest involved children to recall of digits correctly in sequence after listening to each set and these start at two digits length and increased. The scores on this test can be taken to provide a measure of immediate auditory recall. These subtests were piloted with Singaporean children and the results are reported in section 3.4.1.1.

3.3.2.2. BAS: Retrieval and Application of Knowledge

As the purpose of this study was to examine the language progress of the children, subtests from the 'retrieval and application of knowledge' section of the scales were used.

These consisted of 'verbal comprehension', 'verbal fluency' and 'word reading'. Verbal comprehension aimed at assessing children's understanding of language. The tasks required children to respond to a set of instructions which did not require verbal response. Most of the items required identifying items (e.g. picture of a teddy bear), functions of objects (e.g. which one shows the time?) or understanding of prepositions (e.g. put the car under the bridge).

Verbal fluency assessed children's ability in fluent thinking and verbal expression. Children were asked to name as many things to eat and as many animals as they can. They were also presented with ambiguous drawings in which they can say all the things that they might be. This required them to be expressive in their ideas.

The final subtest in this battery was the word reading task. Children were presented with a list of words that ranged from easy and most frequently use words to difficult and less frequently used ones. They were required to read as many as they can starting from the easiest and the task was stopped when ten successive words cannot be read.

3.3.3 Measuring social-emotional development

In measuring children's social-emotional development, this study has adopted two instruments that have been frequently used in studies of pre-school effects. The Pictorial Scale of Perceived Competence and Social Acceptance for Young Children (Harter, 1983) assessed children's sense of self-worth. The second instrument, the Classroom Behaviour Inventory (Schaefer & Edgerton, 1978) which measured child adaptive behaviour in the classroom.

The following describes the background and administration of each social-emotional measure. The validity and reliability of these instruments are reported and includes a description of how they have been used in some research studies of pre-school effects.

3.3.3.1 The Pictorial Scale of Perceived Competence and Social Acceptance for Young Children

The Pictorial Scale of Perceived Competence and Social Acceptance for Young Children (PSPCSA) measured children's self-assessment of their own competence and social acceptance through pictures depicting specific skills and activities, for example, pictures of a child running, playing with friends or completing a puzzle. The scale has four subscales which measured cognitive competence, physical competence, peer acceptance and maternal acceptance. There were 24 items with six items in each subscale and two versions cater for the gender, that is, either male or female. For each item, the children were shown two contrasting pictures, for example, a child "good at puzzles" and a child who "isn't very good at puzzles" (refer to appendix I for example) and asked "which child are you more like." After making the decision, the children were asked to think about the picture they have chosen and asked to indicate whether they were "a lot like" or "just a little like" the child in the picture they chose. A score from a range of 1 to 4 was then assigned for each item. As the author's approach to the assessment of self-worth was domain-specific (Harter & Pike, 1984) , a global score was not calculated but a score of each subscale was calculated to give a profile of self-perceptions across the 4 domains. These can also be aggregated into two constructs, perceived competence and perceived social acceptance.

In establishing the use of the PSPCSA, Harter and Pike administered it to a sample of 90 pre-school, 56 kindergarten, 65 first grade and 44 second grade children for it's reliability. Validity was obtained from a sample of 77 pre-school, 28 kindergarten and 38 first and second grade children.

The authors used factor analysis to determine the scale's factor pattern and found moderate to high factor loadings on two designated subscales. The first factor was defined as items relating to cognitive and physical competence and the second was defined as peer acceptance and maternal acceptance. For the pre-school sample, all items did not cross-load except for two.

For reliability, Harter and Pike (1984) established an internal consistency with coefficients (alpha) ranging from 0.75 to 0.89 for the combined subscales and a range of mid to high 0.80s for the total scale. However, they have also reported that the item means for the competence scales were skewed to the positive end of the scale. This indicated that young children tended to be positive about their competence. Therefore, the reliability coefficients may not be as high as reported.

In relation to validity, an attempt to establish convergent validity was made in the form of interviews with first and second grade children after the administration of the instrument. The children were asked how they knew they were good at something. This was to determine whether children could give reasons for their answers and whether these reasons supported their previous response to the instrument itself. For this group of children, the authors systematically analysed the interviews and found that 96% of them

could give reasons to why they were competent. For younger children, no systematic data were reported but they have found that these "children spontaneously elaborated on their prowess during the course of administration" (Harter & Pike, 1984, p. 1978).

Harter and Pike concluded that children could give definite reasons for their competencies, and found an "overall pattern of convergence between the initial perceived competence judgements and the reasons children offered for these perceptions" (p. 1978).

Although 'convergent validity' appeared to be obtained, interviews might not be a reliable method to validating the scale's construct. Interviews were subjective as they were very dependent on the interviewer and how interviewees might respond to them. As noted in their reliability study, children tended to be confident about their competence. It may be more sound to use another established instrument that measured a similar construct to establish construct validity.

Harter and Pike also reported discriminant validity of each subscale. For the cognitive domain, the authors compared the scores of two groups of children, promoted children and held-back children, and found that the held-back children scored lower than the promoted ones. For the social domain, it was established that the scores of the children who recently moved to the school were lower than the children who were in school longer. Similarly, with the physical domain, scores on 'pre-term' children were compared with scores of 'full-term' children and it was found that 'pre-term' children scored less than the 'full-term' children. For the subscale, maternal acceptance, the authors reported a significant correlation between depression/cheerfulness measures and maternal acceptance

scores. The authors argued that this study established discriminant validity of the instrument.

Studies of pre-school effects like Nabuco (1997) and Hadeed (1994) have used the PSPCSA as a measure of social developmental outcome and found the instrument culturally adaptable. The PSPCSA has also shown to have adequate validity and reliability. It was easy to administer and the pictorial format allowed for ease of comprehension with pre-school children. With the above reasons, the PSPCSA wa selected as one of the measures of social-emotional outcomes. The instrument was piloted in Singapore and results are reported in section 3.4.1.2.

3.3.3.2. Classroom Behaviour Inventory Pre-school Form

The Classroom Behaviour Inventory was a rating scale that assessed adaptive behaviour in pre-school children. The scale consisted of 60 items describing behaviour of pre-school aged children and had six subscales (refer to appendix J). These consisted of verbal intelligence, task orientation, creativity/curiosity which were the aspects of academic competence and considerateness, independence and extraversion which were aspects of social adjustment. Each item was scored on a Likert-type scale ranging from 1 ("not at all like") to 5 ("very much like"). Schaefer and Edgerton (1978) collected data from three daycare centres, with 22 teachers who rated children age from 26 to 71 months. The authors reported coefficients of internal consistency (alpha) ranging from 0.72 to 0.95. The Spearman-Brown corrected interrater reliabilities were found to range from 0.50 to 0.83. A factor analysis of the scale yielded three factors that defined the areas of academic competence, socialisation and temperament.

Several researchers on pre-school effects, such as Phillips, McCartney and Scarr's study (1987), have used the Classroom Behaviour Inventory to measure social competence in young children. The researchers found that the CBI social subscales were correlated significantly with scores obtained from the ECERS. It was also noted by the researchers that the CBI appeared to be more sensitive to differences in 'quality' measurements like the ECERS than the Pre-school Behaviour Questionnaire (Behar & Stringfield, 1974).

Similarly, Dunn's study (1993) used the CBI's social adjustment subscales to measure social development and found that one of the 'distal' quality indicators, caregivers' experience, was significantly predictive of sociability among the children. The CBI was also used to assess children's adjustment at kindergarten level by Howes (1990). She studied the effects of age entry, family characteristics and 'quality' of child care on social adjustment and followed up 80 children through three periods: toddler, pre-school and kindergarten. Howes found that children who attended poor 'quality' day care were assessed as hostile, lacking in task-orientation and consideration on the CBI.

The CBI has shown, in the above studies, to be effective in relating children's social development in relation to 'quality' of day care environment. Therefore this study used four of the subscales of this instrument; these were: creativity/curiosity, considerateness, extraversion and independence as measures of classroom adjustment.

3.3.4. Measuring home background

In order to control for any confounding of the effects of day care environment on developmental outcomes, home background of children is assessed. This study looked

into three areas: parental values, home activities like reading and using published academic workbooks for extra lessons with children ('homework') and some demographic information about the children and their families.

3.3.4.1 Rank Order of Parental Values

The rationale behind investigating parental values was that there might be a relationship between what parents value for their children and the type of day care environment they choose. Such a relationship might exist in this research sample as children were not randomly assigned to day care centres. This mediating effects of parental values has also been established by Kontos (1991) and Phillips, McCartney and Scarr (1987) and Holloway and Reichart-Erickson (1989) referred to in the literature review of chapter two.

The Rank Order of Parental Values was part of a battery of instruments (Parent as Educator Interview, 1977) designed by Schaefer and Edgerton during a three year study of parent-teacher-child interaction and involvement. Please refer to appendix K for the instrument. The measure consisted of three sets of five statements that described values that children can learn. Parents were required to place in rank order the importance of what each statement was to them for their child. Three value factors were derived from the rank order scores: 'conformity' values, 'self-directing' values and 'social' values.

In Schaefer and Edgerton's study of 200 families, they have found that most of these instruments "correlate highly with child competence and adjustment" (Schaefer & Edgerton, 1977, p. 1)). In their study of child care 'quality', Phillips, Scarr and McCartney

(1987) used this measure to obtain parental value scores to control for centre selectivity and found that 'social skills' was a positive predictor of total ECERS score and 'conformity' a negative predictor. They found that "parents who placed a high value on social skills and a low value on conformity selected higher 'quality' child care centres than did other parents" (Phillips et al, 1987:p529).

In Singapore, Seng (1994) found that parental expectations can be an influential factor in children's learning environment. She found that parents expected kindergartens to provide basic training in academic skills, teach children to be independent, and discipline. Interestingly, parents in her study expressed strong agreement that children should be taught to abide by rules and obey teachers. Seng also reported that higher SES parents stressed the need for children to learn social skills and encouraged child-oriented activities in kindergartens. Aspirations and expectations can influence choice of pre-schools for children. Although not using Schaeffer and Edgerton's instrument, Seng's study confirms the need to take into account parental values, aspirations and as predictors when examining the effects of day care on children's development.

3.3.4.2 Child and parent characteristics and home environment

This questionnaire was used to obtain information about the children and their families (refer to appendix L). These related mainly to the social, cultural and economic characteristics of the family such as parental education, the language used at home with children and home activities.

It has been found by Seng (1992) in a nine year research study of Singaporean pre-

schoolers that children benefited more from higher educated parents, more exposure to use of English at home and better home environments. The study compared two groups of pre-schools, non-private and private ones and found that parents of children in private kindergartens, were more educated, spoke English and read more story books to their children. Seng also reported that children from private kindergartens performed better than the non-private group on all English language tasks. In another study by Sharpe (1994), the features of the home and pre-school environment were investigated in relation to bilingual competence in children. Although the study was based on a small sample of three pre-schools with ten children from each, the findings indicated that parental provision of materials and resources was a significant predictor of higher competence in two languages among children.

Based on findings from Singaporean data as well as elsewhere, this study has included maternal education and language spoken at home as control variables in analyses. Parental values and home activities (frequency of reading and working on published academic workbooks with children) were also used to investigate possible confounding effects in a study of the impact of day care on children's development.

3.4 Research procedure

This section describes the pilot study of the measures, the modifications and the administration of these measures to the main sample of children. This includes a description of the training and observer reliability of the Target Child Method of Observation. This is then followed by a report on the training and observer reliability of the Early Childhood Environment Rating Scale and its validation of use in Singapore.

3.4.1 Administration of the outcome measures

Two research assistants were trained to administer the following outcome measures with the children. Training sessions with this researcher was done over two days for three hours each to become familiar with the procedures for each instrument. Each instrument was 'role played' in order to bring about queries and establish standardised administration. A minimum of 50 minutes per child was estimated as a guideline in administering all tasks. These tasks were administered at the beginning of the school year (mid January 1995) to obtain baseline data and at the end of the school year to obtain progress data. A quiet area or room in the day care centre was allocated for these sessions which were conducted on a one-to-one basis. The researchers were instructed to divide the tasks over three days in which each child was assessed no longer than 10 to 15 minutes.

The following describes the pilot study of all outcome measures and the administration to the main sample of children.

3.4.1.1 British Ability Scales

The four tasks that assessed short-form IQ and three other tasks from 'retrieval and application of knowledge' section of the BAS were piloted on a sample of 8 children. These children attended full-time day care at a privately run centre which was not part of the main sample. As all tasks were administered in English, the pilot study examined all possible difficulties in children's response to the tasks due to the language used. The children were chosen according to their gender, age/class group and home language which have been shown to make a difference in performance of tasks. Table 3.2 describes the children selected for this trial run.

Table 3.2

Characteristics of Pilot Sample

Child	Home Language	Sex	Class
1	English	Boy	K1
2	English	Girl	K1
3	English	Boy	K2
4	English	Girl	K2
5	Chinese	Boy	K1
6	Chinese	Girl	K1
7	Chinese	Boy	K2
8	Chinese	Girl	K2

Table 3.3

Pilot Study Results of the British Ability Scales: Number of Correct Responses

Child	Home Language	Verbal Compre-hension	Verbal Fluency	Word Reading	Matrices	Similarities	Naming Vocab -ulary	Recall of Digits
1	English	23	5	1	9	12	14	18
2	English	23	2	4	3	7	12	24
3	English	24	4	7	8	7	12	20
4*	English	26	3	90	10	14	15	25
5	Chinese	23	3	0	3	8	12	16
6	Chinese	22	4	6	3	7	10	13
7	Chinese	25	5	0	3	8	11	27
8	Chinese	23	4	0	10	6	10	19

* This child has been found to have done exceptionally in 'word reading' compared with the other children.

With reference to table 3.3, in general, children whose home language was Chinese had fewer correct responses than children whose home language was English in all the cognitive-language tasks of the BAS. It was noted that child 4 had scored exceptionally well in word reading and according to her teacher, she had extra lessons outside of the school in reading and mathematics. There were minor problems with the language used due to cultural bias in the materials. For example, in the naming vocabulary test, children were required to name a "robin", this was found to be unfamiliar in the Singapore context

and a picture of a pigeon was substituted. Similarly, in the similarities test, "pilchard" was replaced with "shark" (fish names). In all, the BAS was found to be applicable and no serious difficulties were encountered.

3.4.1.2 The Pictorial Scale of Perceived Competence and Social Acceptance for Young Children

In order to establish further the PSPCSA's feasibility in Singapore, the instrument was piloted with the eight children as described above to ensure minimal language problems and cultural bias. In general, it was found that the children could respond to all items with little difficulty. However, the suggested descriptor, "pretty much", used to indicate degree of competence was replaced with "quite much" as it was found more easily understood by the children. The assessment was then administered to the main sample of children, which took an average of 20 minutes per child.

3.4.1.3 Classroom Behaviour Inventory

This rating scale was given to the main class teachers to assess children's social- emotional development and this was done at the beginning of the school year and at the end also. The method of completing each questionnaire was personally explained to the teachers by this researcher and queries answered. The teachers took an average of two weeks to complete all the questionnaires and all were returned.

3.4.2 Administration of the day care environment measures

This section describes the procedures taken to administer the observation instruments which includes the training and reliability of raters.

3.4.2.1 Observer reliability of the Early Childhood Environment Rating Scale

In this study, inter-rater reliability was established just before the start of phase one. To avoid bias in observations, the ECERS was applied 'blind', that is, two observers, unfamiliar with the selected centres, were trained to use the ECERS, instead of the author. Both raters were Masters students through distance-learning, one with the University of Sheffield and the other University of London. The former (rater 1) was a day care centre teacher/supervisor and the latter (rater 2) was a project research assistant at the National Institute of Education, Singapore, who had experience of research in pre-school under the Bernard van Leer Foundation.

The training of raters was done over four weeks beginning with an item by item discussion session of the ECERS manual supported by video sessions. Six on-site observation training sessions were carried out in centres that are not involved in the main study; observers spent all day at the training centres. The first three centres were observed by both raters with the researcher and the next three centres were observed by each rater with the researcher on separate occasions. Separate training sessions had to be conducted due to raters' constraint in their own employment schedule.

The following figure 3.9 shows the inter-rater reliability coefficients that resulted after the training sessions. The Spearman rho was used on the data collected via the ECERS applied to six centres. The ratings were ranked and so a non-parametric test was adopted for correlation analysis. A correlation of 0.87 was achieved between the researcher and rater 1 and 0.89 with rater 2.

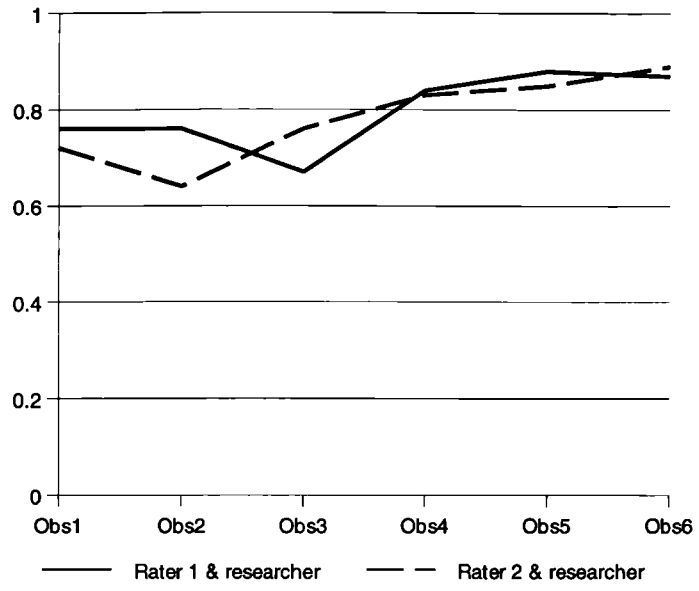


Figure 3.9. ECERS observers' reliability using Spearman rank correlation over six observations

The reliability of rating (correlation coefficients) for each ECERS subscales at the end of six observations is shown in table 3.4. The percentage of agreement, full and within one point of the rating scale, is also reported in the table. On examining the scores for disagreements of more than one point appeared to go in both directions, this would have indicated that the adequate correlations were obtained as systematic bias did not appear to exist.

Table 3.4.

ECERS Total and Subscales Inter-rater reliability[1] and Percentage of Agreement after Six Training/Observation Sessions

	Rater 1 & researcher			Rater 2 & researcher		
	Correlation coefficient	Full agreement (%)	Agreement within 1 point (%)	Correlation coefficient	Full agreement (%)	Agreement within 1 point (%)
Personal Care	0.5	40	60	0.67	80	20
Furnishing & display	0.79	80	20	0.92	40	60
Language & reasoning	0.83	75	25	0.82	75	25
Fine & gross	0.71	83.3	16.7	1.00	100	0
Creative activities	0.84	28.6	57.1	0.84	57.1	42.9
Social development	0.95	83.3	16.7	0.90	83.3	16.7
Adult needs	0.95	50	50	1.00	75	25
Total	0.87	67.6	24.3	0.89	75.7	24.3

[1] Spearman rank correlation was used for analysis
[2] Adults in the centre were unavailable for interview by the raters

As there were 16 centres in total, each ECERS rater was randomly assigned eight centres and in this case both raters were 'blind' to each centres' expert-judged category. The raters spent an average of two days observing the day's programme and interviewing staff members in each centre, after which they rated each of the seven subscales on the ECERS.

3.4.2.2 Validation of the ECERS

The ECERS has been widely used in studies of pre-schools (Beller et al, 1996; Karrby, 1994; Scarr, 1994; Bryant, et al, 1994; Lera, et al, 1996; Farquhar, 1989; Dunn, 1993). However, there were areas of concern among investigators in this field, including culture

validity. The use of the rating scale as a reliable measure has been questioned less often. Also, the items were noted to be value-laden and lack universal norms and that the scale has been found to lack discrimination between subscales and homogeneity within each subscale. This section discusses these areas of concern and how they have been addressed in this study.

The main disadvantage to using a rating scale such as the ECERS is that it involved, to a certain extent, "remembered behaviour or perceived behaviour" (Kerlinger, 1979) and therefore the possibility of observer bias. This is because the occurrence of an event or behaviour might be noted or remembered by one observer and not by another. Another risk in using rating scales is that this form of observation encourages a 'response set', that is, the tendency for the observer to rate the majority of items at the same level. The scores can be all average, above average or below average. In addition, the first impression an observer has may influence the ratings of later items. Kerlinger noted that observers using the rating scale may either rate the behaviours neutrally (error of central tendency) if they are unfamiliar with the instrument and possibly with the issues being investigated. Therefore, given the above reasons, the reliable and valid use of a rating scale need to be established for any research.

The authors of the ECERS have addressed some of these problems and have argued the advantages in the use of this assessment for research. The rating scale attempts to control for varied interpretation and the combination of a numerical scale as well as a descriptive scale increases reliability. Notes of clarification are also included to refer to for examples. The ECERS was judged less time consuming and suitable for the framework of this

research. As it has a range of comprehensive and broad categories, it served the purpose of phase one of this study which was to obtain a general profile of the 16 day care centres. In order to further strengthen reliable use, on-site training for observers, reported in section 4.3.2.1, was conducted and 'blind' observations were made in the main sample.

Harms and Clifford (1980) used the views of American experts in the field of early childhood to validate the instrument and established an agreed model of what is American 'quality' in day care. Similarly, for this study, the ECERS was validated against the views of Singaporean experts. This was done by selecting 16 centres initially rated by expert judges as 'high' or 'not high' in standards of provision reported in section 3.2.3.1. The centres were then rated on the ECERS to explore its validity in Singapore. The results are presented in table 3.5.

Table 3.5

Scores in the ECERS Subscales of Centers Judged by Experts to be of Differing 'Quality'

ECERS Subscales	'High Quality'[1] Centres			'Not High Quality' Centres			P	Range of scores[2]
	Mean	Median	S.D.	Mean	Median	S.D.		
Personal & Care	3.53	3.50	0.21	3.15	3.40	0.75	0.36	2 - 4
Furnishings & Display	2.88	2.70	0.72	2.65	2.30	0.75	0.46	1.8 - 4.4
Language-reasoning	3.38	3.25	0.87	2.13	2.00	0.92	0.03*	1 - 4.75
Fine & Gross Motor	3.77	3.67	0.54	3.56	3.67	0.52	0.48	2.67 - 4.83
Creative Activities	3.79	4.00	0.47	3.25	2.93	0.68	0.06	2.57 - 4.29
Social Development	2.98	2.92	0.53	2.29	2.25	0.42	0.02*	1.83 - 3.83
Adult Needs	3.25	3.25	0.42	3.03	3.13	0.39	0.30	2.25 - 4
Total	3.39	3.42	0.36	2.91	2.72	0.42	0.04*	2.51 - 3.95

Note: Mann-Whitney U analysis was used, non-parametric, N=16 centres

[1] Singaporean expert-judged centres

[2] Possible range of scores for ECERS is a minimum of 1 and maximum of 7

Table 3.5 shows the expert-judged 'high' centre scored higher than the 'not high' centres on all seven sub-scales. Refer to figure 3.10 for a graphic illustration of mean scores of each ECER subscale by expert-judged criteria.

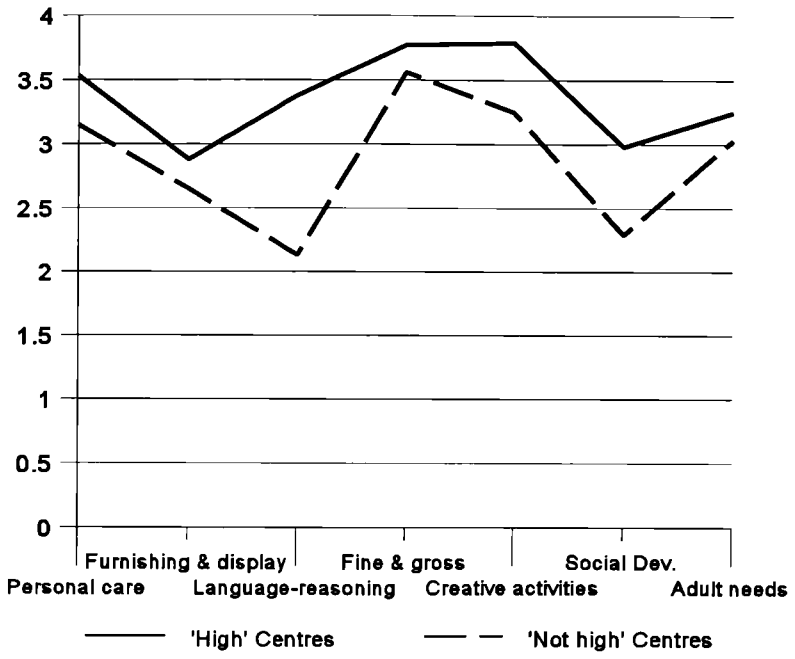


Figure 3.10. Mean scores of ECERS subscales by expert-judged centres.

The Mann-Whitney U test was conducted because the sample (centres) size was small in this study and normal distribution of scores was not obtained Appendix M presents detailed information on individual items and subscales across the sample. It also includes intercorrelations between subscales and a discussion on reasons why it should be validated in different countries. With reference to table 3.7, it was found that for total score on the

ECERS, a significant difference was established ($z=2.10$, $p<0.05$). This meant that the ECERS has significantly discriminated between the 'high' and 'not high' centres. Out of the seven subscales, two subscales were also significantly different. For the subscale, *language-reasoning experiences*, the 'high' group of centres scored a mean of 3.38 compared to 2.13 by the 'not high' group. This difference was statistically significant ($z=2.21$, $p<0.05$). Similarly, for the subscale, *social development*, the 'high' group scored a higher mean of 2.98 compared to the 'not high' group with 2.29, a difference also statistically significant ($z=2.38$, $p<0.05$).

To summarise then, it has been established that the 'high quality' centres scored higher than the 'not high' centres on all the subscales. Statistically significant differences in the total index score of the ECERS, *language-reasoning* and *social development* subscales have also been obtained. Given that sample size was small, it is worth noting that the subscale, *creative activities*, approaches significance ($z=1.85$, $p=0.06$) in discriminating between the centres. It can then be argued that discriminant validity has been established and the ECERS was validated for use in Singapore.

Interestingly, although Harms and Clifford obtained statistical validity for the ECERS, they also noted the "lack of universally accepted norms for early childhood environments" and suggested that "further work be carried out in this area" (Harms & Clifford, 1980:p38). Some might argue that ECERS reflected the values of those who defined what a 'quality' day care environment constitutes. To address this criticism, a second validity exercise constituted an examination of the 'quality' categories found in the Ministry of Community Development Child Care Evaluation Instrument (Ministry of

Community Development, Singapore, 1995) in an attempt to establish some possible shared criteria with ECERS.

The Ministry of Community Development (MCD) evaluation instrument consisted of eight subscales with their respective items and table 3.6 compares this instrument to the seven ECERS subscales:

Table 3.6

Comparison of Subscales between MCD Evaluation Instrument and the ECERS

MCD EVALUATION INSTRUMENT		HARMS & CLIFFORD'S ECERS
1.	Centre Environment Indoor environment Equipment and materials Outdoor environment	Furnishing and Display for Children
2.	Safety, Health, Nutrition, and Hygiene Safety Health Nutrition	Personal Care Routine of Children
3.	Curriculum	Language-Reasoning Experiences Fine and Gross Motor Activities Creative Activities
4.	Interaction between Staff and Children	Social Development
5.	Staffing Requirements	?
6.	Record-keeping	?
7.	Staff Coordination, Development and Evaluation	Adult Needs
8.	Centre-Parent Partnership	

The MCD evaluation instrument was a Likert-type rating scale with 7-points that had a descriptive range from inadequate, minimal, good to excellent at points one, three, five

and seven. Only the subscales; *safety, health, nutrition and hygiene*, *staffing requirements* and *record-keeping* involved a 3-point rating scale with descriptive range of inadequate to adequate at both ends.

With reference to the above table, it appeared that *'staffing requirements'* and *'record-keeping'* in the MCD instrument were excluded in the ECERS. It is possible that this was because *'staffing requirements'* was considered to be a regulatory variable that ECERS did not aim to include in their definition of 'environment'. *'Record-keeping'* was a feature in the MCD instrument requiring the supervisor to keep records of "attendance, fees, health status, and children's development and progress, and utilising other community resources" (Ministry of Community Development, Singapore, 1995). The rationale behind this requirement was that a high 'quality' day care reflected efficiency in "running an effective operation" and this required the supervisor to adopt a "systematic approach" to managing a centre. This perhaps was evidence of an underlying value in Singapore that the MCD instrument has reflected, that is, 'efficiency' was taken to be indicative of 'success' in the Singapore context. However, on examining the rest of the Singaporean subscales, all seven ECERS subscales were found to be similar to six of the eight found in the MCD evaluation instrument. This suggested an acceptable degree of content validity in the use of ECERS in Singapore.

Another criticism about the ECERS being value-laden was observed by Brophy and Statham (1994). In their use of the ECERS on playgroups in Britain, the instrument was found to place a high value on scheduled and planned activities and given a score of seven or 'excellent' if evident. This went against playgroups that valued 'free play' and less

structure for their children. Although there was a clash of values between the playgroups and the ECERS, this was not so with the MCD's rationale of what a 'quality' curriculum constitutes. It was similar to the ECERS in that the curriculum should be "a planned and reliable framework of routines" (Ministry of Community Development, Singapore , 1995).

It can than be argued from the above analyses, that the ECERS had content validity as it appeared to contain shared norms of what was considered 'quality' features with the Singaporean day care evaluation instrument.

Brophy and Statham (1994) also noted that the ECERS did not claim to describe children's experiences in the environment. It was therefore, possible for a pre-school to score highly on an ECERS subscale, like *gross motor activities*, but children were not found to be engaging in any of the activities. They also noted that "environments therefore create an important potential for good quality individual experiences, but they do not necessarily ensure it" (Brophy & Statham, 1994:p70). This, then, argued for a need to examine the experiences offered by the day care centres in order to obtain a more holistic picture of environmental variations. This study included a systematic observations of children's task involvement and social grouping as described in section 3.3.1.2.

3.4.2.3 Observer reliability of the Target Child Method of Observation

To become familiar with the administration of the Target Child Method of observation, this researcher made observations using the system with 12 pre-school children from a college day care centre in London. Ten-minute observations consisting of 30-second intervals were made and then coded using the Target Child Coding Manual under

Professor Sylva's supervision to get clearer understanding of using the codes. This observation was again piloted in Singapore with 12 children (6 K1 and 6 K2, 6 boys and 6 girls) from a private day care centre. For this trial run, twenty-minute observations with 30-second intervals were made over typical days in the centre's programme which generally covers directed academic activity, 'free' play and domestic activities. The observations were then coded in consultation with Prof Sylva again.

To obtain observer reliability before and during the main data collection, this researcher and an assistant (Early Childhood Diploma student/pre-school teacher) met for four training sessions in which the Target Child Method of Observation and coding manual were discussed. Video training sessions were also used in which on-the-spot coding and discussion were done. Two sets of observer reliability was calculated for this phase of the study. The first set consisted of 294 half-minute intervals of observations at two private day care centres that enot part of the research sample. There were 15 children observed.

The kappa statistical test (Cohen, 1960) was used to calculate inter-observer reliability which corrects for chance agreement. The kappa values shown in table 3.7, for task and social codes, were obtained for this first set of observations:

Table 3.7

Pilot sample: kappa coefficients for Target Child Observer Reliability

Behaviour category	Kappa
Task code	0.902
Social code	0.915

The second set of observations consisted of 1040 thirty-second intervals at centres that were subsamples of the main group of research centres. The kappa was calculated and are shown in table 3.8.

Table 3.8

Pilot sample: Kappa Coefficients for Target Child Observer Reliability

Behaviour category	Kappa
Task code	0.915
Social code	0.868

The total number of 30-second intervals observed in the reliability sample was 1334 (294 from the pilot sample and 1040 from the subsample) which made up 10.4% of the total number of intervals for the whole sample (12,800 intervals).

In order to obtain a representative time sample of typical child behaviour in each centre, ten children (5 boys and 5 girls) from each of the 16 centres were observed for two 20-minute sessions of consecutive 30-second intervals. These 20-minute sessions were observed at random which meant that each child from the ten was selected randomly for observations. A total of 6.67 hours (400 minutes) of observations was conducted at each

centre which made up 70% of the day's programme. (An average day at centres for children spanned from 8.30 am to 6pm, although officially all day care centres were opened from 7am to 7pm). The 16 centres were divided between the two observers, this researcher observed 10 centres and the other observed 6 centres. The latter observer was constrained by employment schedule and contract therefore, took time off through vacation leave to conduct her observations.

3.4.3 Administration of home background measures

A questionnaire was sent home to parents through the children at the beginning of this project to obtain child and parental biodata. The teachers have been instructed to help parents who may have difficulty in the English language. The teachers reported minimal difficulties and all the parents responded. The home environment questionnaire, that included information relating to Rank Order of Parental Value and home activities, was explained to teachers who are involved in the study. They were instructed to explain the questionnaire to the parents with the request that both parents completed it together. Staff reported no difficulties with the exercise and all parents returned the forms completed.

The research design used in this study involved a pre-test and post-test of 122 pre-school aged children's language and social-emotional development over one school year. These child outcomes were measured by tasks from the British Ability Scales. The Early Childhood Environment Rating Scale and the Target Child Method of Observation were used to assess the characteristics of 16 day care centres. Data from these measures are used as explanatory variables to establish the effectiveness of different aspects of the day

care environment on enhancing language and social-emotional development. Table 3.9 presents a summary of the instruments used in this study. The following chapter presents the results of this study.

Table 3.9

Summary of the Research Instruments used in this Study

Predictor Variables	**Outcome Variables**
Day Care Environment	**Cognitive Development**
Early Childhood Environment Rating Scale	British Ability Scales
- Total ECERS	- Matrices
- Personal care and routine	- Similarities
- Furnshings and display	- Recall of digits
- Language-reasoning experiences	- Naming vocabulary
- Fine/gross motor activities	
- Creative activities	**Language Development**
- Social development	
- Adult needs	British Ability Scales
	- Verbal fluency
Target Child Method of Observation	- Verbal comprehension
- Task involvement	- Word reading
- Social grouping	
	Social-emotional
Family Environment	**Development**
Rank Order of Parental Values	Classroom Behaviour Inventory
- conformity	- Considerateness
- social	- Independence
- self-direction	- Extraversion
	- Creativity/curiosity
Home activities questionnaire	
- reading at home	PSPCSA (Harter)
- homework	- Perceived competence
	- Perceived social acceptance

CHAPTER FOUR: RESULTS I (ECERS)

4.1 Introduction

This results chapter begins with a plan of data analysis. Findings are reported in three main parts. The first part describes associations between characteristics of the day care environment and linguistic and social-emotional progress after taking account of the characteristics of the children. Since previous studies have shown that family background influences child outcomes, the second part reports associations between home background variables and linguistic and social-emotional progress of young children. The final part of this chapter re-examines the effects of day care environment on children's progress with home background taken into account.

4.2 Strategy of data analysis

The first part begins with a description of scores collected for each language and social-emotional outcome. These include means, standard deviations and distributions of scores. Distributions that were not found to be normally distributed were transformed, either by square-root or square transformation. Pre-test and post-test scores are presented in scatterplots and where a non-linear relationship was found, a quadratic term was included in the regression analyses. Outliers were identified by the SPSS programme and omitted where appropriate.

This descriptive analysis of the data is followed by multiple regression analyses to investigate associations between different aspects of the day care environment as

predictors and children's outcomes, adjusting for the characteristics of children. There are four analyses in this part. The first involved establishing whether there was a centre effect for each particular child outcome. Dummy variables were created for the 16 day care centres and each outcome was regressed on these variables. To obtain a more accurate picture of centre effect, these regressions adjusted for child characteristics that includes pre-test, age, gender, IQ, language and time in care. Mother's education was also included because of its established contribution to child progress (Melhuish et al, 1990a; Kontos & Fiene, 1987). It is noted that pre-test scores may have included the influence of these other variables because these individual differences have been shown to be previously important and therefore exist at pre-assessment.

Where centre effects were not established, further analyses were not conducted. When centre effects were established, a second analysis was conducted. This analysis involved regressing each child outcome on the total centre 'quality' score, with child characteristics and mother's education included also. A third set of analyses were then conducted using a concise model of regression for each outcome on each 'quality' subscale (ECERS). It is hypothesised that specific areas of the day care environment can be identified to have a significant effect on each child developmental outcome. This specific information may help to provide professionals with concrete recommendations to improve day care.

The fourth set of analyses investigated two possible interactions; (a) centre 'quality' by mother's education and (b) centre 'quality' by time in day care. The former was investigated because it was predicted that attendance in high 'quality' day care centres may compensate for disadvantaged home background which was measured in this study

by a 'proxy' variable, mother's education. The latter interaction was investigated because it was predicted that progress will be greater per unit time in centre care among children attending a high 'quality' centre compared with children who attend a lower 'quality' centre.

In the second part of this results chapter, multiple regression analyses were conducted for each child outcome on home activities and parental values to investigate whether these variables were potentially confounding the associations between centre 'quality' and children's progress. Home activities consisted of frequency of reading books and using academic workbooks at home. Parental values consisted of three child-rearing values of conformity, pro-social behaviour and self-direction. Child characteristics and mother's education were included in these analyses.

The final part investigated the strength of day care 'quality' effects on outcomes adjusted for the influence of home background. Where the possibility of confounding was established, specific characteristics of the day care environment previously shown to have significant effects on outcomes were re-analysed to take account of home background variables. Table 4.1 gives a summary of the strategy of data analyses.

Table 4.1

Summary of Data Analysis Strategy for Each Child Outcome Variable

Part I: The Effects of Characteristics of Day Care Environment
Analysis 1: To investigate centre effect
Step 1: Pre-test, child characteristics and mother's education
Step 2: Day care centres (dummy coded)
Analysis 2: To investigate total centre 'quality' effect
Step 1: Pre-test, child characteristics and mother's education
Step 2: Total ECERS score
Analysis 3: To investigate ECERS subscale 'quality' effect (concise model)
Step 1: Pre-test and significant explanatory variables obtained in analysis 1
Step 2: ECERS subscale (each subscale entered separately)
Analysis 4: To investigate interactive effects
Step 1: Pre-test, child characteristics and mother's education
Step 2: Centre 'quality' x mother's education or centre 'quality' x time in care (each entered separately)
Part II: The Effects of Home Background
Analysis 1: To investigate parental value and home activities effect
Step 1: Pre-test, child characteristics, mother's education, parental values, home reading homework
Part III: The Effects of Day Care Characteristics with Home Background taken into account
Analysis 1: To re-analyse the effect of significant characteristics of day care environment on child outcomes after taking account of home background
Step 1: Pre-test, significant child characteristics and mother's education, significant ECERS subscale and significant home background variables

Part One

4.3 Relationship between language progress and characteristics of the day care environment

Language outcomes of children were assessed by three measures. These assessed children's reading skill, verbal comprehension and fluency. The instruments were:

(i) Verbal fluency (British Ability Scales, 1983)

(ii) Word reading (British Ability Scales, 1983)

(iv) Verbal comprehension (British Ability Scales, 1983)

4.3.1 Results of verbal fluency progress

4.3.1.1 Description of verbal fluency scores

Verbal fluency task was administered to 122 children at pre-test and 118 children at post-test. The results showed that higher mean score was obtained at post-test (9.81) compared to the mean score obtained at pre-test (6.89). Table 4.2 presents the means, standard deviations and range of scores. A t-test for dependent samples found this increase of 2.92 to be significant ($t=9.59$, $df=117$, $p<0.01$). The distribution of scores was found to be symmetrical and a scatterplot of pre-test and post-test scores, in figure 4.1, shows a linear relationship ($r=0.39$, $p<0.01$).

Table 4.2

Means, Standard Deviations and Range of Scores for Verbal Fluency by Testing Stages.

	Mean	S.D.	Range
Pre-test	6.89	2.64	2 - 14
Post-test	9.81	3.19	2 - 18

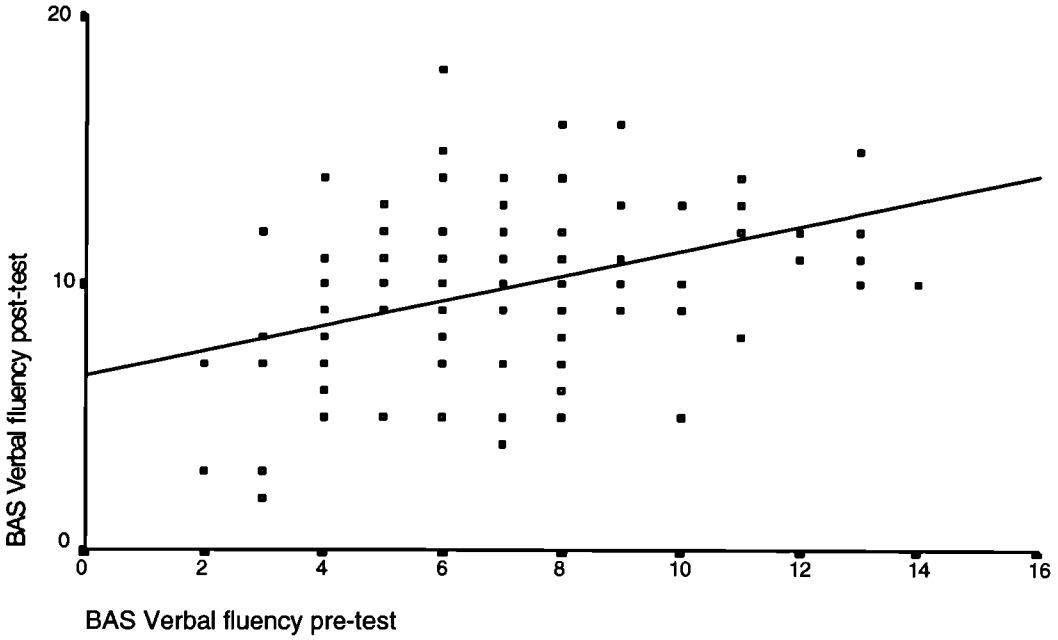


Figure 4.1. Scatterplot of verbal fluency pre-test and post-test scores.

4.3.1.2 Centre effects on verbal fluency progress

Before investigating a centre effect, verbal fluency was regressed on pre-test scores, child characteristics and mother's education in the first step of this analysis. The results in table 4.3 show that these variables explained a significant proportion, 21%(r-sq=0.21), of the variance of verbal fluency ($F=3.22$, $df=8$, $p<0.01$). In this analysis, mother's education was shown to be significantly associated with verbal fluency outcome ($t=2.01$, $p=0.05$) with a positive coefficient of 1.45 indicating that children with graduate mothers did better (mean=10.78, n=29) than children with non-graduate mothers (mean=9.48, n=90).

Table 4.3

Multiple Regression Analysis of Progress in Verbal Fluency on Pre-test, Child Characteristics and Mother's Education

Predictor variable	B	Error of B	T	P
Pre-test	0.50	0.13	3.95	<0.01*
Age	0.003	0.05	0.05	0.96
Gender[1]	-0.19	0.61	-0.32	0.75
Short form IQ	-0.004	0.03	-0.14	0.89
Time in care	0.009	0.03	0.32	0.75
Home language (English & Chinese)[2]	-0.86	0.68	-1.26	0.21
Home language (Chinese)[2]	-0.83	0.77	-1.08	0.28
Mother's education[3]	1.45	0.72	2.01	0.05*
df=8, intercept=-6.56, r-sq=0.21, F=3.22, p<0.01				

Note. N (pre-test)=122, N (post-test)=118

[1] Boys=1, girls=0

[2] There are three groups, two dummy variables are entered into the equation. The third group is 'English'.

[3] Graduate=1, non-graduate=0

To establish centre effect on verbal fluency, centres were created as dummy variables, and entered next into the regression equation. The r-square, change in r-square and their F statistics are presented in the table 4.4. The results showed that after controlling for the effects of pre-test, child characteristics and mother's education, centres explained 22% of the variance in verbal fluency progress (r-sq=0.22, F=2.11, p<0.05).

Table 4.4

Multiple Regression Analysis (fixed order) of Progress in Verbal Fluency on Pre-test, Child Characteristics, Mother's Education and Day Care Centres

		R	R-square	Change in r-square	F	P
Step 1	Pre-test, Child characteristics, Mother's education	0.46	0.21	0.21	3.22	<0.01*
Step 2	Day care centres	0.66	0.43	0.22	2.11	0.02*

Note. Day care centres created as dummy variables

4.3.1.3. Relationship between total centre 'quality' and verbal fluency progress

Based on the above finding that centres contributed to the variance in verbal fluency outcomes, a further analysis was conducted to investigate the effect of centre 'quality' as assessed by the ECERS score. Verbal fluency was regressed on total score obtained from the ECERS, after adjusting for 'step 1' variables.

The results in table 4.5 showed that after controlling for pre-test score, child characteristics and mother's education, centre 'quality' was found to be a significant predictor variable of verbal fluency. The combined influence of the predictor variables explained 28% of the variance in verbal fluency (r-sq=0.28, F=4.05, p<0.01).

In a separate hierarchical regression model when pre-test score, child characteristics and mother's education were entered in step 1 and then centre 'quality' added in step 2, the change in variance accounted for by 'quality' was estimated. This indicated that 7% of the variance in verbal fluency was explained by centre 'quality' alone (r-sq=0.07, t=2.94, p<0.01). This separate model of analysis was also conducted for the other child outcomes investigated in this chapter.

Table 4.5

Multiple Regression Analysis of Progress in Verbal Fluency on Pre-test, Child Characteristics, Mother's Education and Centre 'Quality'

Predictor variable	B	Error of B	T	P
Pre-test	0.62	0.13	4.81	<0.01*
Age	-0.01	0.05	-0.20	0.84
Gender[1]	-0.39	0.59	-0.67	0.51
Short form IQ	-0.001	0.03	-0.04	0.97
Time in care	0.01	0.03	0.53	0.60
Home language (English & Chinese)[2]	-0.75	0.66	-1.14	0.26
Home language (Chinese)[2]	-0.47	0.75	-0.62	0.54
Mother's education[3]	0.75	0.73	1.03	0.31
Centre 'quality'	2.14	0.73	2.94	<0.01*
df=9, intercept=-0.38, r-sq=0.28, F=4.05, p<0.01				

Note. N (pre-test)=122, N (post-test)=118

[1] Boys=1, girls=0

[2] There are three groups, two dummy variables are entered into the equation. The third is 'English'.

[3] Graduate=1, non-graduate=0

4.3.1.4 Interactive effects on verbal fluency progress

The effect of two interactions were investigated. The first analysis tested the effect of the interaction between centre 'quality' and mother's education on verbal fluency. The response variable was regressed on a new variable, 'quality' x mother's education, with child characteristics and mother's education included. The interaction was not significantly associated with verbal fluency (t=-1.00, p>0.05). The second analysis explored the effects of the interaction between centre 'quality' and time in day care centre on the outcome. The result also showed a non-significant relationship with verbal fluency (t=0.18, p>0.05).

4.3.1.5 Relationship between 'quality' subscales and verbal fluency progress

In addition to regressing verbal fluency on total 'quality' score, the effects of ECERS subscales on the outcome were investigated. Pre-test score, the only significant variable in the previous analysis (see table 4.5) was included in these analyses.

(i) Language-reasoning Experiences

Table 4.6 shows that 22% of the variance of verbal fluency was explained by the combined influence of the predictor variables (r-sq=0.22, F= 15.90, p<0.01). The *language-reasoning* subscale was a significant predictor variable for verbal fluency explaining 6% of the variance(r-sq=0.06, t=3.02, p<0.01) after controlling for pre-test score.

Table 4.6

Concise Model of Multiple Regression Analysis of Progress in Verbal Fluency on Language-reasoning Experiences

Predictor variable	B	Error of B	T	P
Pre-test	0.56	0.10	5.41	<0.01*
Language-reasoning Experience	0.78	0.26	3.02	<0.01*
df=2, intercept=3.82 ,r-sq=0.22, F=15.09, p<0.01				

Note. N (pre-test)=122, N (post-test)=118

(ii) Social Development

Table 4.7 shows that 25% of the variance of verbal fluency was explained by the combined influence of the two predictor variables (r-sq=0.25, F=19.54, p<0.01). The *social development* subscale was associated significantly with verbal fluency and explained 10% of the variance (r-sq=0.10, t=3.91, p<0.01) after adjusting for pre-test score.

Table 4.7

Concise Model of Multiple Regression Analysis of Progress in Verbal Fluency on Social Development

Predictor variable	B	Error of B	T	P
Pre-test	0.57	0.10	5.69	<0.01*
Social development	1.81	0.46	3.91	<0.01*
df=2, intercept=1.15 , r-sq=0.25, F=19.54, p<0.01				
Note. N (pre-test)=122, N (post-test)=118				

(iii) Personal Care and Routines of Children

Table 4.8 presents the results of analysis of verbal fluency when regressed on pre-test score including *personal care and routines* subscale. The combined variables explained 23% of the variance in verbal fluency. The subscale was a significant predictor variable (t=3.32, p<0.05) for verbal fluency and explained 7% (r-sq=0.07, t=3.32, p<0.01) of its variance alone.

Table 4.8

Concise Model of Multiple Regression Analysis of Progress in Verbal Fluency on Personal and Care Routines

Predictor variable	B	Error of B	T	P
Pre-test	0.57	0.10	5.28	<0.01*
Personal and Care Routines	1.65	0.50	3.32	<0.01*
df=2 , intercept=0.32, r-sq=0.23, F=17.04, p<0.01				
Note. N (pre-test)=122, N (post-test)=118				

(iv) Furnishings and Display for Children

Table 4.9 shows that the two predictor variables combined explained 21% of the variance in verbal fluency (r-sq=0.21, F=15.11, p<0.01). The subscale, *furnishings and display*,

was significantly associated with verbal fluency, after controlling for pre-test score. The change in r-square statistic showed that the subscale alone explained 5% of the variance in verbal fluency (r-sq=0.05, t=2.79, p<0.01).

Table 4.9

Concise Model of Multiple Regression Analysis of Progress in Verbal Fluency on Furnishings and Display

Predictor variable	B	Error of B	T	P
Pre-test	0.54	0.10	5.30	<0.01*
Furnishings and Display	1.09	0.39	2.79	0.01*
df=2, intercept=3.03, r-sq=0.21, F=15.11, p<0.01				
Note. N (pre-test)=122, N (post-test)=118				

(v) Adult Needs

Table 4.10 presents the results of analysis of verbal fluency when regressed on pre-test and *adult needs* subscale. The combined variables explained 20% of the variance in verbal fluency (r-sq=0.20, F=14.09, p<0.01). The subscale was associated with verbal fluency significantly and explained 4% (r-sq=0.04, t=2.47, p<0.05) of its variance alone.

Table 4.10

Concise Model of Multiple Regression Analysis of Progress in Verbal Fluency on Adult Needs

Predictor variable	B	Error of B	T	P
Pre-test	0.49	0.10	4.89	<0.01*
Adult Needs	1.70	0.69	2.47	0.02*
df=2, intercept=1.05, r-sq=0.20, F=14.09, p<0.01				
Note. N (pre-test)=122, N (post-test)=118				

(vi) Creative Activities

Table 4.11 shows that pre-test and *creative activities* combined explained 20% of the variance in verbal fluency (r-sq=0.20, F=14.59, p<0.01). The ECERS subscale was shown to be a significant predictor variable and 5% of the variance in verbal fluency was explained by this subscale alone (r-sq=0.05, t=2.63, p<0.01).

Table 4.11

Concise Model of Multiple Regression Analysis of Progress in Verbal Fluency on Creative Activities

Predictor variable	B	Error of B	T	P
Pre-test	0.54	0.10	5.25	<0.01*
Creative Activities	1.18	0.45	2.63	0.01*
df=2, intercept=1.93, r-sq=0.20, F=14.59, p<0.01				
Note. N (pre-test)=122, N (post-test)=118				

(vii) Fine and Gross Motor Activities

Table 4.12 shows that the two predictor variables combined explained 16% of the variance in verbal fluency (r-sq=0.16, F=10.60, p<0.01). However, *fine and gross motor activities*, was not a significant predictor variable (t=0.41, p>0.05).

Table 4.12

Concise Model of Multiple Regression Analysis of Progress in Verbal Fluency on Fine and Gross Motor Activities

Predictor variable	B	Error of B	T	P
Pre-test	0.47	0.10	4.49	<0.01*
Fine and Gross Motor Activities	0.22	0.54	0.41	0.68
df=2, intercept=5.73, r-sq=0.16, F=10.60, p<0.01				

Note. N (pre-test)=122, N (post-test)=118

4.3.1.6 Summary of verbal fluency progress

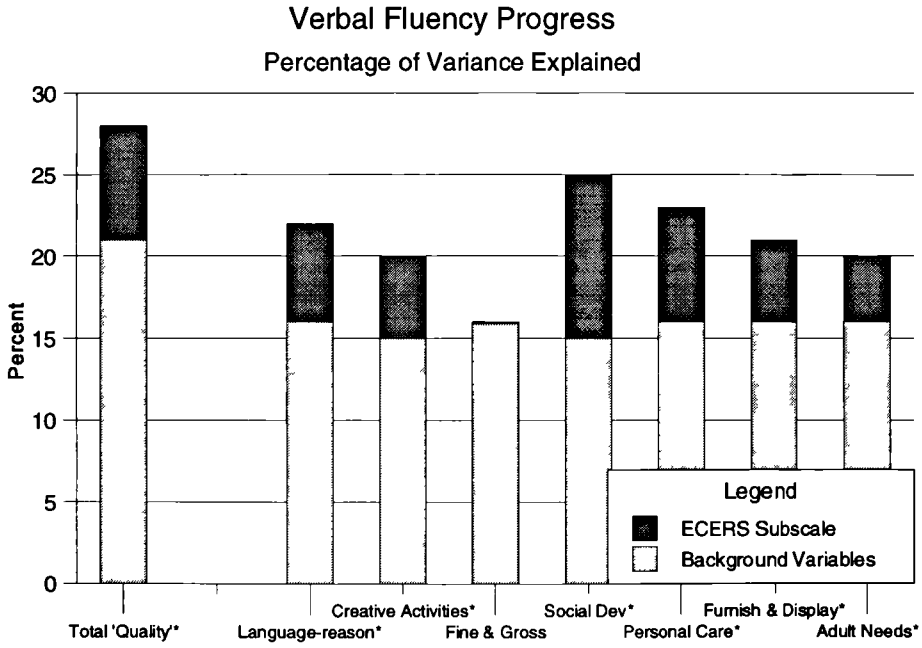
In summary, the results showed that mother's education was a significant influence on children's verbal fluency development. The findings suggested that children with graduate mothers perform better on verbal fluency than children with non-graduate mothers. Since the effect of mother's education was significant and independent of pre-test, this finding means that mother's education continued to influence verbal fluency during the study period, i.e., over and above any influence mother's education may already have had by the start of the study which would have been reflected in a child's pre-test score. The results also indicated that progress in verbal fluency was positively associated with centre 'quality' after the effects of pre-test, child characteristics and mother's education were partialled out. Except for *fine and gross motor activities*, all the other subscales of the ECERS were found to have a significant influence on verbal fluency progress. Table 4.13 shows a summary of percentage of variance explained by total 'quality' (table 4.5) and by each subscale analysed in the separate regression models (tables 4.6 to 4.12). *Social development* explained the most variance in the outcome (10%), followed by *personal and care routines* of children (7%) and *language-reasoning experiences* (6%). *Furnishings*

and display and *creative activities* each explained 5% of the variance in verbal fluency and *adult needs* explained 4%. Figure 4.2 illustrates the results.

Table 4.13
Summary of Results from Tables 4.6 to 4.12
Percent of Variance in Verbal Fluency Explained by ECERS Subscales

ECERS Subscales	R^2 Change (%)
Language-reasoning Experiences	6**
Creative Activities	5**
Fine & Gross Motor Activities	0.1
Social Development	10**
Personal & Care Routines	7**
Furnishings & Display	5**
Adult Needs	4*

Note. ** $p<0.01$ * $p<0.05$



* significant predictor variable

Figure 4.2. Bar chart of variance in verbal fluency progress explained by total ECERS and subscales

4.3.2 Results of word reading progress

4.3.2.1 Description of word reading scores

The word reading task was administered to 122 children at pre-test and 118 children at post-test. As scores were found to be positively skewed, medians and interquartile ranges are reported in table 4.14. The results showed that a median of 16.00 was obtained at post-test compared to a median of 2.00 at pre-test.

Table 4.14

Medians and Interquartile Ranges for Word Reading by Testing Stages.

	Median	1st Quartile	3rd Quartile
Pre-test	2.00	0	10
Post-test	16.00	7	25

A non-parametrics test, the Wilcoxon Matched-Pairs Signed-rank test, established a significant difference between the two sets of scores ($z=9.02$, $p < 0.01$).

For further statistical analyses, post-test scores were transformed using a square root transformation. The relationship between pre-test and the transformed post-test was found to be non-linear as shown in the scatterplot in figure 4.3. A quadratic term was then included in subsequent regression analyses.

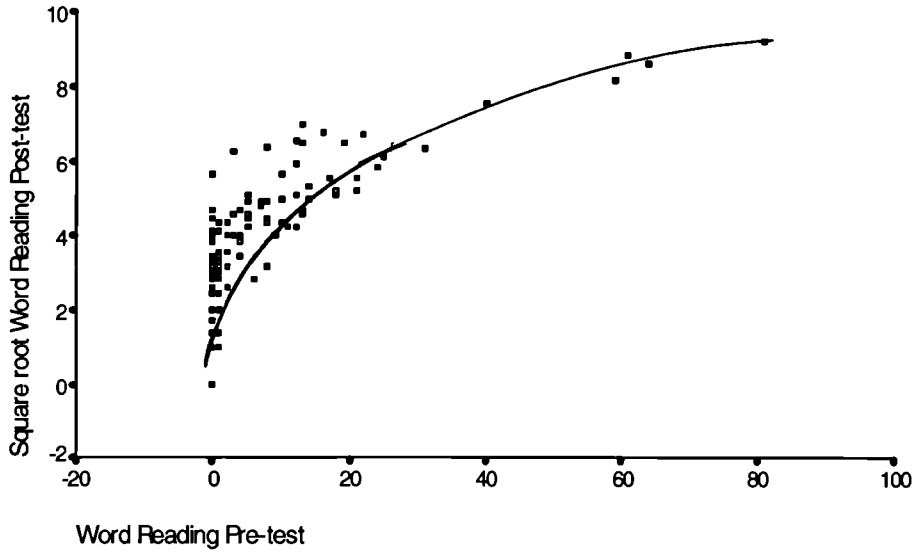


Figure 4.3. Scatterplot of word reading pre-test and post-test scores

4.3.2.2. Centre effects on word reading progress

Word reading was regressed on pre-test, child characteristics and mother's education. The results, as presented in table 4.15, showed that the explanatory variables combined explained 67% (r-sq=0.67. F=21.65, $p<0.01$) of the variance of word reading progress. In this model, the time spent in day care centre was found to be significantly associated with word reading progress ($t=2.16$, $p<0.05$). The coefficient of 0.02 indicates a positive relationship but this is small.

Table 4.15

Multiple Regression Analysis of Progress in Word Reading on Pre-test, Child Characteristics and Mother's Education

Predictor variable	B	Error of B	T	P
Pre-test	0.21	0.02	8.29	<0.01*
Sq pre-test	-0.002	0.0004	-5.00	<0.01*
Age	-0.01	0.02	-0.34	0.74
Gender[1]	-0.09	0.24	-0.29	0.70
Short form IQ	0.02	0.01	1.47	0.15
Time in care	0.02	0.01	2.16	0.03*
Home language (English & Chinese)[2]	0.03	0.27	0.12	0.90
Home language (Chinese)[2]	-0.27	0.30	-0.91	0.37
Mother's education[3]	0.43	0.29	1.49	0.14
df=9, intercept=0.94, r-sq=0.67, F=21.65, p<0.01				

Note. N (pre-test)=122, N (post-test)=118

[1] Boys=1, girls=0

[2] There are three groups, two dummy variables are entered into the equation. The third is 'English'.

[3] Graduate=1, non-graduate=0

To establish centre effect on word reading, centres were entered as dummy variables into the equation as a second step. The r-square and change in r-square and their F statistics are presented in table 4.16. The results indicated that after including pre-test, child variables and mother's education, centres explained 12% of the variance in word reading scores significantly (r-sq=0.12, F=2.89, p<0.01).

Table 4.16

Multiple Regression Analysis (fixed order) of Progress in Word Reading on Pre-test score, Child Characteristics, Mother's Education and Day Care Centres

		R	R-square	Change in r-square	F	P
Step 1	Pre-test, Child characteristics, Mother's education	0.82	0.67	0.67	21.65	<0.01*
Step 2	Day care centres	0.89	0.79	0.12	2.89	<0.01*

Table 4.17

Multiple Regression Analysis of Progress in Word Reading on Pre-test Scores, Child Characteristics, Mother's Education and Centre 'Quality'

Predictor variable	B	Error of B	T	P
Pre-test	0.21	0.03	8.26	<0.01*
Sq pre-test	-0.002	0.0004	-5.00	<0.01*
Age	-0.01	0.02	-0.35	0.72
Gender[1]	-0.11	0.24	-0.44	0.66
Short form IQ	0.02	0.01	1.50	0.14
Time in care	0.02	0.01	2.17	0.03*
Home language (English & Chinese)[2]	0.04	0.27	0.16	0.87
Home language (Chinese)[2]	-0.25	0.31	-0.80	0.42
Mother's education[3]	0.38	0.31	1.24	0.22
Centre 'Quality'	0.15	0.29	0.51	0.61
df=10, intercept=0.46, r-sq=0.67, F=19.36, p<0.01				

Note. N (pre-test)=122, N (post-test)=118

[1] Boys=1, girls=0

[2] There are three groups, two dummy variables are entered into the equation. The third is 'English'.

[3] Graduate=1, non-graduate=0

4.3.2.3 Relationship between total centre 'quality' and word reading progress

As there was a centre effect on word reading, a further regression analysis was conducted with centre 'quality' entered as an additional explanatory variable. Results as shown in table 4.17 indicated that centre 'quality' was not a significant explanatory variable for word reading ($t=0.51$, $p>0.05$). Time spent in care was shown to be a consistent significant predictor variable.

4.3.2.4 Interactive effects on word reading progress

The effects of interactions on word reading progress were considered. The first analysis investigated the interaction of centre 'quality' and mother's education. Word reading was regressed on child characteristics, mother's education and this interaction variable. With reference to table 4.18, the findings showed a significant effect of the interaction on word reading progress ($t=-2.27$, $p<0.05$). Figure 4.4 shows the interaction after adjusting for pre-test scores. This suggested that children of graduate mothers progressed better than children of non-graduate mothers in lower quality centres. Children with non-graduate mothers progressed slightly more than children with graduate mothers in higher 'quality' centres. Therefore, there is some indication that increasing centre 'quality' has a beneficial effect for children of non-graduate mothers. Paradoxically, children of graduate mothers appeared to have progressed less in high 'quality' centres than in low 'quality' centres, this seemed implausible unless a threshold of 'quality' from home experiences has been reached such that the high 'quality' of day care matters little to progress in word reading. However, it is simplest to consider this marginally significant interaction as a chance finding given the many tests conducted in this study.

The second analysis investigated the effects of the interaction between centre 'quality' and time in day care on word reading. The result showed a non-significant relationship with the child outcome (t=0.92, p>0.01).

Table 4.18

Multiple Regression Analysis of Progress in Reading on Interaction between Centre 'Quality and Mother's Education

Predictor variable	B	Error of B	T	P
Pre-test	0.21	0.02	8.46	<0.01*
Sq pre-test	-0.002	0.0004	-5.30	<0.01*
Age	-0.01	0.02	-0.46	0.64
Gender[1]	-0.14	0.24	-0.57	0.57
Short form IQ	0.02	0.01	1.99	0.05*
Time in care	0.02	0.01	2.11	0.04*
Home language (English & Chinese)[2]	-0.01	0.27	-0.04	0.97
Home language (Chinese)[2]	-0.27	0.30	-0.88	0.38
Mother's education[3]	5.29	2.19	2.42	0.02*
Centre 'quality'	0.52	0.33	1.60	0.11
Centre 'quality' x mother's education	-1.49	0.66	-2.27	0.03*
df=11, intercept=-1.03, r-sq=0.69, F=18.84, p<0.01				

Note. N (pre-test)=122, N (post-test)=119

[1] Boys=1, girls=0

[2] Consists of three groups, two created as dummy variables, the third is 'English'.

[3] Graduate=1, non-graduate=0

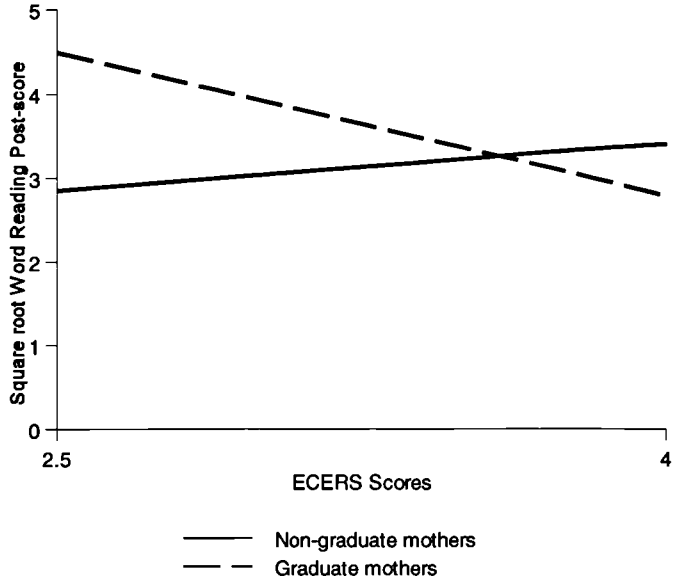


Figure 4.4. Line graph of the interaction between ECERS scores and mother's education on word reading post-test scores after adjusting for pre-test scores

4.3.2.5 Relationship between 'quality' subscales and word reading progress

The effects of individual ECERS subscales on word reading were investigated in this section. A concise regression model was used by including explanatory variables that were found to be significantly associated with word reading.

(i) Personal Care and Routines of Children

Table 4.19 shows that 66% of the variance in word reading was explained by the combined influence of predictor variables (r-sq=0.66, F=48.88, p<0.01). *Personal care and routines* subscale was a significant predictor variable for word reading and explained 1% of the variance (r-sq=0.01, t=1.99, p<0.05).

Table 4.19

Concise Model of Multiple Regression Analysis of Progress in Word Reading on Personal Care and Routines

Predictor variable	B	Error of B	T	P
Pre-test	0.20	0.02	9.14	<0.01*
Sq pre-test	-0.002	0.0003	-4.94	<0.01*
Time in care	0.02	0.01	1.98	0.05*
Personal Care and Routines	0.40	0.20	1.99	0.05*
df=4, intercept=0.93, r-sq=0.66, F=48.88, p<0.01				
Note. N (pre-test)=122, N (post-test)=118				

(ii) Adult Needs

Table 4.20 shows that 67% of the variance in word reading was explained by the combined influence of the predictor variables (r-sq=0.67, F=50.30, p<0.01). The *adult needs* subscale was a significant predictor variable for word reading and explained 2% of the variance (r-sq=0.02, t=2.44, p<0.05).

Table 4.20

Concise Model of Multiple Regression Analysis of Progress in Word Reading on Adult Needs

Predictor variable	B	Error of B	T	P
Pre-test	0.21	0.02	9.46	<0.01*
Sq pre-test	-0.002	0.0003	-5.17	<0.01*
Time in care	0.02	0.01	2.25	0.03*
Adult Needs	0.73	0.30	2.44	0.02*
df=4, intercept=-0.12, r-sq=0.67, F=50.30, p<0.01				
Note. N (pre-test)=122, N (post-test)=118				

(iii) Language-reasoning Experiences

Table 4.21 shows that 65% of the variance in word reading was explained by the combined influence of the predictor variables (r-sq=0.65, F=46.63, p<0.01). The *language-reasoning experiences* subscale explained only 0.3% of the variance in word reading and this was not a significant predictor variable (r-sq=0.003, t=0.87, p>0.05).

Table 4.21

Concise Model of Multiple Regression Analysis of Progress in Word Reading on Language-reasoning Experiences

Predictor variable	B	Error of B	T	P
Pre-test	0.21	0.02	9.05	<0.01*
Sq pre-test	-0.002	0.0004	-4.91	<0.01*
Time in care	0.02	0.01	2.21	0.03*
Language-reasoning experiences	0.10	0.11	0.87	0.39
df=4, intercept=1.89, r-sq=0.65, F=46.63, p<0.01				

Note. N (pre-test)=122, N (post-test)=118

(iv) Creative Activities

Table 4.22 shows that 65% of the variance in word reading was explained by the combined influence of the explanatory variables (r-sq=0.65, F=46.11, p<0.01). The *creative activities* subscale explained only 0.01% of the variance in word reading and was not a significant predictor variable (r-sq=0.0001, t=0.14, p>0.05).

Table 4.22

Concise Model of Multiple Regression Analysis of Progress in Word Reading on Creative Activities

Predictor variable	B	Error of B	T	P
Pre-test	0.20	0.02	8.96	<0.01*
Sq pre-test	-0.002	0.0003	-4.80	<0.01*
Time in care	0.02	0.01	2.15	0.03*
Creative Activities	0.03	0.19	0.14	0.89
df=4, intercept=2.09, r-sq=0.65, F=46.11, p<0.01				
Note. N (pre-test)=122, N (post-test)=118				

(v) Social Development

Table 4.23 shows that 65% of the variance in word reading was explained by the combined influence of the predictor variables (r-sq=0.65, F=47.69, p<0.01). *The social development* subscale explained only 1% of the variance in word reading and this was also not significant (r-sq=0.01, t=1.50, p>0.05).

Table 4.23

Concise Model of Multiple Regression Analysis of Progress in Word Reading on Social Development

Predictor variable	B	Error of B	T	P
Pre-test	0.21	0.02	9.20	<0.01*
Sq pre-test	-0.002	0.0004	-5.08	<0.01*
Time in care	0.02	0.01	2.25	0.03*
Social Development	0.33	0.22	1.50	0.14
df=4, intercept=1.28, r-sq=0.65, F=47.69, p<0.01				
Note. N (pre-test)=122, N (post-test)=118				

(vi) Fine and Gross Motor Activities

Table 4.24 shows that 65% of the variance in word reading was explained by the combined influence of the predictor variables (r-sq=0.65, F=46.13, p<0.01). The *fine and gross motor activities* subscale explained only 0.02%of the variance in word reading and was not a significant predictor variable (r-sq=0.0002, t=0.23, p>0.05).

Table 4.24

Concise Model of Multiple Regression Analysis of Progress in Word Reading on Fine and Gross Motor Activities

Predictor variable	B	Error of B	T	P
Pre-test	0.20	0.02	9.00	<0.01*
Sq pre-test	-0.0012	0.0003	-4.80	<0.01*
Time in care	0.02	0.01	2.14	0.03*
Fine and Gross Motor Activities	0.05	0.23	0.23	0.82
df=4, intercept=2.00, r-sq=0.65, F=46.13, p<0.01				
Note. N (pre-test)=122, N (post-test)=118				

(vii) Furnishings and Display for Children

Table 4.25 shows that 65% of the variance in word reading was explained by the combined influence of the predictor variables (r-sq=0.65, F=46.10, p<0.01). The *furnishings and display* subscale explained only 0.002%of the variance in word reading and was also not a significant predictor variable (r-sq=0.00002, t=-0.08, p>0.05).

Table 4.25

Concise Model of Multiple Regression Analysis of Progress in Word Reading on Furnishings and Display

Predictor variable	B	Error of B	T	P
Pre-test	0.20	0.02	9.01	<0.01*
Sq pre-test	-0.002	0.0003	-4.81	<0.01*
Time in care	0.02	0.01	2.14	0.04*
Furnishings and Display	-0.01	0.17	-0.08	0.93
df=4, intercept=2.23, r-sq=0.65, F=46.10, p<0.01				
Note. N (pre-test)=122, N (post-test)=118				

4.3.2.6 Summary of word reading progress

In summary, of the background variables, pre-test score and time spent in day care appeared to have some influence on progress in word reading. The finding suggested that the more time spent in day care the more progress in reading achievement. The results did not establish a significant association between progress in word reading and centre 'quality' after the effects of pre-test, child characteristics and mother's education were partialled out. However, a significant interaction between mother's education and centre 'quality' on wording reading was obtained in which centre 'quality' appeared to have less influence on children with graduate mothers than children with non-graduate mothers. But the results seemed spurious and unlikely as it was shown that children with graduate mothers in high 'quality' centres had poorer word reading scores than children with non-graduate mothers.

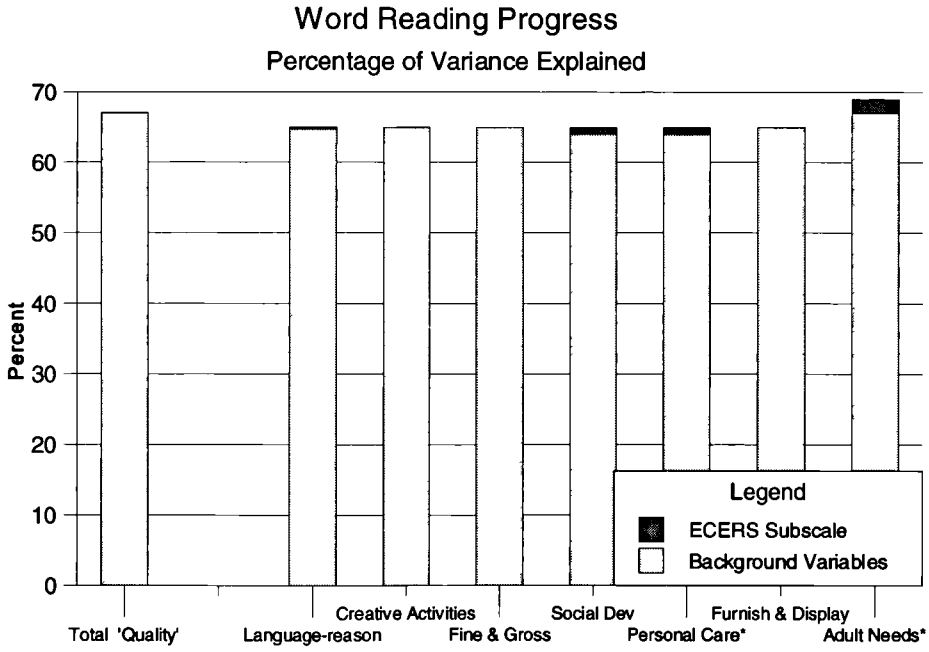
On investigating the influence of ECERS subscales on word reading progress, the results indicated that *personal care and routines* and *adult needs* were significantly associated

with the outcome. The relationship was positive for both subscales and explained 2% (*adult needs*) and 1% (*personal care and routines*) of the variance in word reading progress. Table 4.26 shows a summary of the variance explained by each subscale obtained from tables 4.19 to 4.25. Figure 4.5 illustrates the results.

Table 4.26
Summary of Results from Tables 4.19 to 4.25
Percent of Variance in Word Reading Progress Explained by ECERS Subscales

ECERS Subscales	R^2 Change (%)
Language-reasoning Experiences	0.3
Creative Activities	0.01
Fine & Gross Motor Activities	0.02
Social Development	1
Personal & Care Routines	1*
Furnishings & Display	0.002
Adult Needs	2*

* $p<0.05$



* Significant predictor variable

Figure 4.5. Bar chart of variance in word reading progress explained by total ECERS and subscales

4.3.3 Results of verbal comprehension progress

4.3.3.1 Description of verbal comprehension scores

The verbal comprehension task was administered to 122 children at pre-test and 118 children at post-test. The mean score obtained at pre-test is 21.74 with a standard deviation of 3.26. A higher mean score of 24.10 was obtained at post-test with a standard deviation of 1.54. Table 4.27 presents these descriptive statistics and includes the range of scores. A t-test for dependent samples found this difference in scores to be significant ($t=9.18$, $df=117$, $p<0.01$).

Table 4.27

Means, Standard Deviations and Range of Scores for Verbal Comprehension by Testing Stages.

	Mean	S.D.	Range
Pre-test	21.74	3.26	4 - 30
Post-test	24.10	1.54	18 - 27

The distribution of the scores were found to be normally distributed and a scatterplot, as presented in figure 4.6, indicates that the relationship between pre-test and post-test was linear. However, the figure also shows that for this task, there may be a ceiling effect because of the 'funnel' appearance. This can mean that the task was easy for the children. Three outliers were identified and omitted from subsequent analysis.

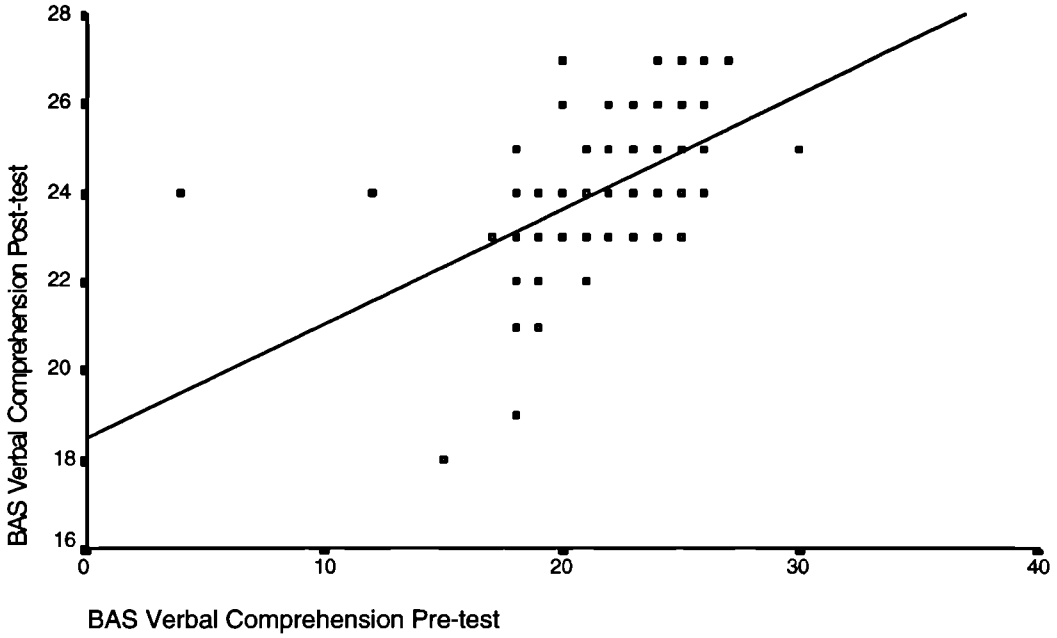


Figure 4.6. Scatterplot of verbal comprehension pre-test and post-test scores

4.3.3.2 Centre effects on verbal comprehension progress

In order to establish a centre effect on verbal comprehension progress, two steps in multiple regression were conducted. The first step involved regressing the outcome on pre-test, age, gender, IQ, language used at home, time spent in day care centre and mother's education. The results, shown in table 4.28, indicated that the combined explanatory variables explained 47% of the variance in verbal comprehension (r-sq=0.47, F=10.46, df=8, $p<0.01$). The analysis also showed that mother's education was significantly related to verbal comprehension (t=3.08, $p<0.01$). The positive coefficient indicated that children with graduate mothers progressed more (mean=24.85, n=29) compared to children with non-graduate mothers (mean=23.84, n=90).

Table 4.28

Multiple Regression Analysis of Progress in Verbal Comprehension on Pre-test, Child Characteristics and Mother's Education

Predictor variable	B	Error of B	T	P
Pre-test	0.28	0.04	6.23	<0.01*
Age	0.02	0.02	1.11	0.27
Gender[1]	-0.22	0.21	-1.02	0.31
Short form IQ	0.004	0.01	0.47	0.64
Time in care	0.01	0.01	0.74	0.46
Home language (English & Chinese)[2]	-0.05	0.24	-0.23	0.82
Home language (Chinese)[2]	-0.25	0.28	-0.89	0.38
Mother's education[3]	0.78	0.25	3.08	<0.01*
df=8, intercept=16.20, r-sq=0.47, F=10.46, p<0.01				

Note. N (pre-test)=122, N (post-test)=118

[1] Boys=1, girls=0

[2] There are three groups, two dummy variables are entered into the equation. The third group is 'English'.

[3] Graduate=1, non-graduate=0

Day care centres were entered as dummy variables, into the equation, as the next step. With reference to table 4.29, day care centres explained 7% of the variance of verbal comprehension and this was not significant (r-sq=0.07, F=0.93, p>0.05).

Table 4.29

Multiple Regression Analysis (fixed order) of Progress in Verbal Comprehension on Pre-test, Child Characteristics, Mother's Education and Day Care Centres

		R	R-square	Change in r-square	F	P
Step 1	Pre-test, Child characteristics, Mother's education	0.72	0.52	0.52	12.61	<0.01*
Step 2	Day Care centres	0.77	0.59	0.07	0.93	0.53

As a centre effect was not established in the above analysis, further analyses of centre 'quality' and its effects on verbal comprehension were not conducted.

4.3.4 Summary of the effects of day care environment on language progress

With regards to the effects of centre 'quality' on language outcomes, the results showed that centre 'quality' affects verbal fluency more significantly than the other two language outcomes. With reference to table 4.30, the regression coefficients (b values) showed that all significant relationships were positive. For example, the coefficient of total 'quality' for verbal fluency was 2.14 which meant that with every one unit increase in centre 'quality', verbal fluency increased by 2.14 in raw score.

The magnitude of effects of total and subscale 'quality' on verbal fluency was moderate to large[1] as shown by the beta weights. For example, the effect size (ES) of 0.29 for total 'quality' on verbal fluency was considered moderate to large. The largest effect of the subscales was the 'quality' of social development (ES=0.32) followed by *personal care*

[1] Cohen (1977) classificatory scheme of effect sizes for regression analysis (beta weight).

and routines (ES=0.29) and *language-reasoning experiences* (ES=0.26). These dimensions represent interactive experiences that encourage talk and social interaction among children and therefore can enhance verbal fluency. The subscale that did not significantly influence verbal fluency was *fine and gross motor activities*. It is possible that this dimension measured more physical rather than verbal activities, and therefore was not significant in its effect on the verbal outcome.

For word reading outcome, two subscales, *personal care/routines* and *adult needs* appeared to be significant predictors. The magnitude of effect for both was small to moderate (see footnote 1). Perhaps domestic experiences that involved meals, personal grooming and rest presented a more informal learning environment. It may be that meaningful reading and possibly number skills were learnt from daily experiences like reading a menu or a shampoo bottle label. Centres that scored higher on the 'quality' scale may have staff using these situations as learning opportunities for children. With the subscale, *adult needs*, the positive effect can be a possible indication that opportunities for professional growth and better staff training can enhance better practice in the teaching of reading. Also, better staff-parent communication and education may give more support to this learning environment.

On the other hand, centre effect was not established for verbal comprehension. This may mean that variance in this outcome was influenced by some other factors and therefore, it is difficult to infer any day care 'quality' effect. However, it is noted that mother's education, as found in section 4.3.3.2, was one of the significant predictors of verbal comprehension.

Perhaps, from looking at the pre-test and post-test scores, there may be a near ceiling effect of this outcome (refer to figure 4.6). This can mean that the task was easy for the children and that most of them were able to respond correctly on both occasions. It may also indicate that the children at post-testing failed on the same items on which they failed at the pre-test level indicating no improvement. However, the difference in mean scores between the two testing levels showed a significant (refer to table 4.26) improvement in performance.

The general finding from background variables suggested that mother's education was an influential variable on language development. This was found with verbal fluency and verbal comprehension outcomes where children with graduate mothers progressed better than children with non-graduate mothers.

Table 4.30

The Effects of Total and ECERS Subscales 'Quality' on Language Outcomes

		Language Outcomes	
Predictor Variables		Verbal fluency	Word reading
Total 'Quality'	B	2.14**	n.s.
	Effect size[1]	0.29**	
Language-reasoning experiences	B	0.78**	n.s.
	Effect size	0.26**	
Creative activities	B	1.18**	n.s.
	Effect size	0.23**	
Furnishings & display	B	1.09**	n.s.
	Effect size	0.24**	
Social development	B	1.81**	n.s.
	Effect size	0.32**	
Fine & gross motor activities	B	n.s.	n.s.
	Effect size		
Personal care & routines	B	1.65**	0.44*
	Effect size	0.29**	0.12*
Adult needs	B	1.70*	0.73*
	Effect size	0.21*	0.14*

Note. Centre effect was not established for verbal comprehension.
[1] beta weights
* $p<0.05$ ** $p<0.01$

4.4 Relationship between social-emotional progress and characteristics of the day care environment

Social-emotional outcomes were assessed by two measures. The first of these was the Classroom Behaviour Inventory (CBI, Schaefer & Edgerton, 1978) that assessed adaptive behaviour in the classroom. The four bi-polar dimensions measured in this study were:

(i) Considerateness-hostility

(ii) Creativity/curiosity-apathy

(iii) Extraversion-introversion

(iv) Independence-dependence

A higher score in one of these dimensions reflected more positive behaviour (e.g. more considerateness) and less negative behaviour (e.g. less hostility).

The second instrument used to measure social-emotional outcome of children was the Pictorial Scale of Perceived Competence and Social Acceptance for Young Children (Harter, 1983). This self-assessment yielded two dimensions of self-concept; perceived competence and social acceptance.

4.4.1 Results of CBI Considerateness-hostility behaviour

4.4.1.1 Description of Considerateness-hostility scores

Initial descriptive analysis showed that a mean score of 9.91 was obtained at pre-test and a mean score of 9.13 was obtained at post-test. The standard deviations, as presented in table 4.31, indicated slightly more spread of scores at post-test although the mean was lower. A paired t-test was conducted which did not establish a significant difference between pre-test and post-test scores ($t=1.42$, $df=118$, $p > 0.05$).

Table 4.31

Means, Standard Deviations and Range of Scores for Considerateness-hostility by Testing Stages

	Mean	S.D.	Range
Pre-test	9.91	7.68	-9 - 25
Post-test	9.13	7.99	-16 - 26

The distribution of scores was normally distributed with a range of -16 to 26 for post-test and -9 to 25 for pre-test. Figure 4.7 shows a scatterplot of a linear relationship between the two sets of scores ($r=0.65$, $p < 0.01$). One outlier was identified and omitted in subsequent analyses.

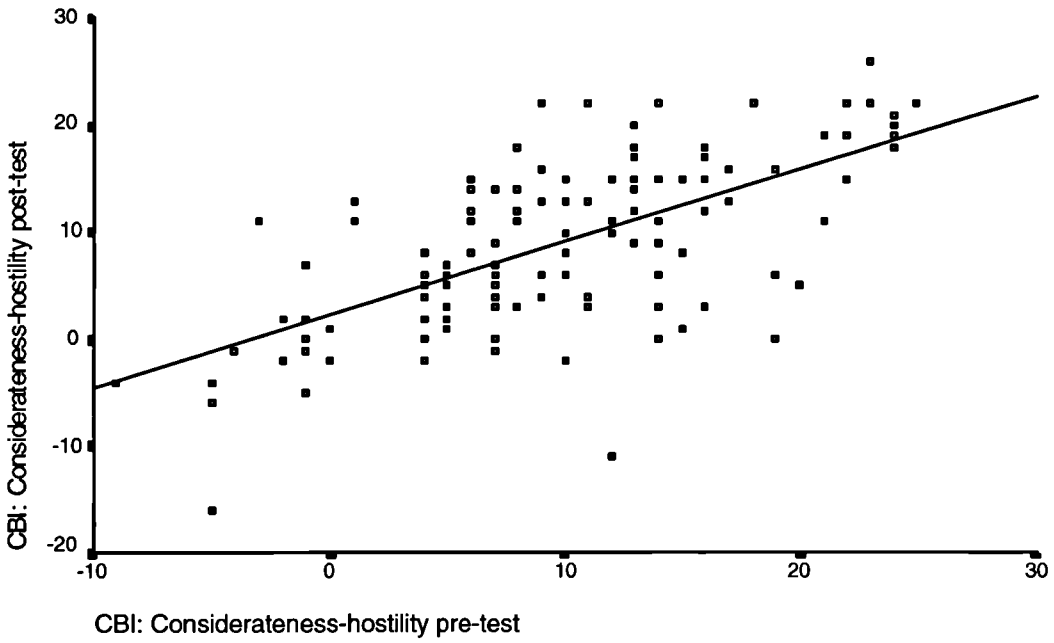


Figure 4.7. Scatterplot of CBI Considerateness-hostility pre-test and post-test scores

4.4.1.2 Centre effects on considerateness-hostility behaviour

The first step in the analysis of considerateness-hostility outcome included pre-test scores, child characteristics and mother's education as predictors. The findings, as presented in table 4.32, showed that 55% of the variance in considerateness-hostility was explained by the predictors combined (r-sq=0.55, F=14.38, df=8, $p<0.01$). Gender was found to be a significant explanatory variable of the outcome in which boys appeared to have scored lower (mean=7.67, n=70) on considerateness-hostility than the girls (mean=11.16, n=52). The results also showed that language spoken at home appeared to be associated with considerateness-hostility. Of the three groups, children who spoke two languages at home (i.e., English and Chinese), scored 2.46 points more than children who spoke English at home and 2.42 points more than children who spoke Chinese at home.

Table 4.33 shows the results of the second step in this analysis, in which 16 centres were created as dummy variables and entered into the equation. The findings showed that centres explained 15% of the variance in considerateness-hostility (r-sq=0.15, F=2.72, $p<0.01$).

Table 4.32

Multiple Regression Analysis of Considerateness-hostility Post-scores on Pre-test, Child Characteristics and Mother's Education

Predictor variable	B	Error of B	T	P
Pre-test	0.64	0.07	8.70	<0.01*
Age	0.13	0.09	1.47	0.14
Gender[1]	-2.65	1.11	-2.38	0.02*
Short form IQ	0.07	0.05	1.51	0.13
Time in care	0.002	0.05	0.04	0.97
Home language (English & Chinese)[2]	2.46	1.25	1.97	0.05*
Home language (Chinese)[2]	0.04	1.41	0.03	0.98
Mother's education[3]	2.00	1.37	1.46	0.15
df=8, intercept=-12.87, r-sq=0.55, F=14.38, p<0.01				

Note. N (pre-test)=122, N (post-test)=119

[1] Boys=1, girls=0

[2] Consists of three groups, two created as dummy variables, the third is 'English'.

[3] Graduate=1, non-graduate=0

Table 4.33

Multiple Regression Analysis (fixed order) of Considerateness-hostility Post-scores on Pre-test, Child Characteristics, Mother's Education and Day Care Centres

		R	R-square	Change in r-square	F	P
Step 1	Pre-test, Child characteristics, Mother's education	0.74	0.55	0.55	14.38	<0.01*
Step 2	Day care centres	0.84	0.70	0.15	2.72	<0.01*

4.4.1.3 Relationship between total centre 'quality' and considerateness-hostility behaviour

Because a centre effect was established in the above analyses, total 'quality' score obtained from the ECERS was then introduced as an explanatory variable. Table 4.34 shows that total centre 'quality' predicted considerateness-hostility significantly. The combined influence of all predictor variables explained 56% of the variance in considerateness-hostility (r-sq=0.56, F=13.63, p<0.01). Total ECERS alone explained 2% of the variance (r-sq=0.02, t=2.00, p=0.05). Both variables, gender and language spoken at home, continued to be significant predictors as found in previous analysis.

Table 4.34

Multiple Regression Analysis of Considerateness-hostility Post-scores on Pre-test, Child Characteristics, Mother's Education and Centre 'Quality'

Predictor variable	B	Error of B	T	P
Pre-test	0.62	0.07	8.50	<0.01*
Age	0.14	0.09	1.6	0.11
Gender[1]	-2.84	1.10	-2.58	0.01*
Short form IQ	0.08	0.05	1.70	0.09
Time in care	0.004	0.05	0.08	0.94
Home language (English & Chinese)[2]	2.68	1.24	2.17	0.03*
Home language (Chinese)[2]	0.51	1.40	0.36	0.72
Mother's education[3]	1.20	1.41	0.85	0.40
Centre 'Quality'	2.60	1.30	2.00	0.05*
df=9, intercept=-22.10, r-sq=0.56, F=13.63, p<0.01				

Note. N (pre-test)=122, N (post-test)=118

[1] Boys=1, girls=0

[2] Consists of three groups, two created as dummy variables, the third is 'English'.

[3] Graduate=1, non-graduate=0

4.4.1.4 Interactive effects on considerateness-hostility behaviour

Two interaction effects on considerateness-hostility were investigated. The first analysis examined the effect of the interaction between centre 'quality' and mother's education on the response variable after taking into account pre-test, child characteristics and mother's education. The interaction was not significant ($t=-1.49$, $p>0.05$). The second analysis explored the effects of the interaction between centre 'quality' and time in day care which was also shown to be not significant ($t=-0.11$, $p>0.05$).

4.4.1.5 Relationship between 'quality' subscales and considerateness-hostility behaviour

Further analyses were conducted on the relationship between each subscale of the ECERS and post-test scores in considerateness-hostility. A concise model, in which significant explanatory variables obtained from previous analyses, were included in the regression model.

(i) Personal Care and Routines of Children

Table 4.35 shows that 54% of the variance in considerateness-hostility was explained by the combined influence of the predictor variables (r-sq=0.54, $F=26.70$, $p<0.01$). The *personal care and routines* subscale was shown to be a significant predictor variable ($t=3.16$, $p<0.01$) and explained 4% of the variance in the considerateness-hostility (r-sq=0.04, $F=10.01$, $p<0.01$).

Table 4.35

Multiple Regression Analysis of Considerateness-hostility Post-scores on Personal Care and Routines

Predictor variable	B	Error of B	T	P
Pre-test	0.67	0.07	10.01	<0.01*
Gender[1]	-2.48	1.01	-2.45	0.02*
Home language (English & Chinese)[2]	0.08	1.13	1.84	0.07
Home language (Chinese)[2]	-0.64	1.31	-0.49	0.63
Personal Care and Routines	2.88	0.91	3.16	<0.01*
df=5, intercept=-6.11, r-sq=0.54, F=26.70, p<0.01				

Note. N (pre-test)=122, N (post-test)=119

[1] Boys=1, girls=0

[2] Consists of three groups, two created as dummy variables, the third is 'English'.

(ii) Social Development

Table 4.36 shows that 52% of the variance in considerateness-hostility was explained by the combined influence of all the predictor variables (r-sq=0.52, F=24.72, p<0.01). The *social development* subscale was a significant predictor variable and explained 2% of the variance in the considerateness-hostility (r-sq=0.02, t=2.26, p<0.05).

(iii) Fine and Gross Motor Activities

Table 4.37 shows that 53% of the variance in considerateness-hostility was explained by the combined influence of the predictor variables (r-sq=0.53, F=25.42, p<0.01). The *fine and gross motor activities* subscale explained 3% of the variance in considerateness (r-sq=0.03, t=2.61, p<0.01).

Table 4.36

Multiple Regression Analysis of Considerateness-hostility Post-scores on Social Development

Predictor variable	B	Error of B	T	P
Pre-test	0.62	0.07	8.78	<0.01*
Gender[1]	-2.39	1.03	-2.32	0.02*
Home language (English & Chinese)[2]	2.26	1.15	1.96	0.05*
Home language (Chinese)[2]	0.59	1.35	-0.44	0.66
Social Development	2.08	0.92	2.26	0.03*
df=5, intercept=-1.71, r-sq=0.52, F=24.72, p<0.01				

Note. N (pre-test)=122, N (post-test)=119
[1] Boys=1, girls=0
[2] Consists of three groups, two created as dummy variables, the third is 'English'.

Table 4.37

Multiple Regression Analysis of Considerateness-hostility Post-scores on Fine and Gross Motor Activities

Predictor variable	B	Error of B	T	P
Pre-test	0.69	0.07	10.13	<0.01*
Gender[1]	-2.21	1.03	-2.16	0.03*
Home language (English & Chinese)[2]	2.65	1.16	2.29	0.02*
Home language (Chinese)[2]	-0.22	1.36	-0.16	0.87
Fine and Gross Motor Activities	2.71	1.04	2.61	0.01*
df=5, intercept=-7.12, r-sq=0.53, F=25.42, p<0.01				

Note. N (pre-test)=122, N (post-test)=119
[1] Boys=1, girls=0
[2] Consists of three groups, two created as dummy variables, the third is 'English'.

(iv) Language-reasoning Experiences

Table 4.38 shows that 51% of the variance in considerateness-hostility was explained by the combined influence of the predictor variables (r-sq=0.51, F=23.30, p<0.01). The *language-reasoning* subscale explained only 1% of the variance in the response variable and this was not significant (t=1.25, p>0.05).

Table 4.38

Concise Model of Multiple Regression Analysis of Considerateness-hostility Post-scores on Language-reasoning Experiences

Predictor variable	B	Error of B	T	P
Pre-test	0.64	0.07	8.94	<0.01*
Gender[1]	-2.62	1.07	-2.46	0.02*
Home language (English & Chinese)[2]	2.48	1.20	2.08	0.04*
Home language (Chinese)[2]	-0.69	1.38	-0.50	0.62
Language-reasoning Experiences	0.66	0.53	1.25	0.21
df=5, intercept=1.84, r-sq=0.51, F=23.30, p<0.01				

Note. N (pre-test)=122, N (post-test)=119
[1] Boys=1, girls=0
[2] Consists of three groups, two created as dummy variables, the third is 'English'.

(v) Creative Activities

Table 4.39 shows that 50% of the variance in considerateness-hostility was explained by the combined influence of the predictor variables (r-sq=0.50, F=22.77, p<0.01). The *creative activities* subscale explained only 0.1% of the variance in progress and this was not significant (t=0.50, p>0.05).

Table 4.39

Concise Model of Multiple Regression Analysis of Considerateness-hostility Post-scores on Creative Activities

Predictor variable	B	Error of B	T	P
Pre-test	0.66	0.07	9.41	<0.01*
Gender[1]	-2.48	1.08	-2.30	0.02*
Home language (English & Chinese)[2]	2.30	1.20	1.92	0.06
Home language (Chinese)[2]	-0.89	1.38	-0.64	0.52
Creative Activities	0.45	0.89	0.50	0.62
df=5, intercept=1.91, r-sq=0.50, F=22.77, p<0.01				

Note. N (pre-test)=122, N (post-test)=119

[1] Boys=1, girls=0

[2] Consists of three groups, two created as dummy variables, the third is 'English'.

(vi) Furnishings and Display for Children

Table 4.40 shows that 51% of the variance in considerateness-hostility was explained by the combined influence of the predictor variables (r-sq=0.51, F=23.40, p<0.01). *Furnishings and display* subscale explained 1% of the variance in the response variable, however, this was not significant (t=1.35, p>0.05).

Table 4.40

Concise Model of Multiple Regression Analysis of Considerateness-hostility Post-scores on Furnishing and Display

Predictor variable	B	Error of B	T	P
Pre-test	0.65	0.07	9.25	<0.01*
Gender[1]	-2.44	1.05	-2.33	0.02*
Home language (English & Chinese)[2]	2.33	1.18	1.98	0.05*
Home language (Chinese)[2]	-0.81	1.36	-0.60	0.55
Furnishings and Display	1.00	0.74	1.35	0.18
df=5, intercept=0.79, r-sq=,0.51 F=23.40, p<0.01				

Note. N (pre-test)=122, N (post-test)=119
[1] Boys=1, girls=0
[2] Consists of three groups, two created as dummy variables, the third is 'English'.

Table 4.41

Concise Model of Multiple Regression Analysis of Considerateness-hostility Post-scores on Adult Needs

Predictor variable	B	Error of B	T	P
Pre-test	0.68	0.07	9.77	<0.01*
Gender[1]	-2.48	1.05	-2.36	0.02*
Home language (English & Chinese)[2]	2.44	1.19	2.05	0.04*
Home language (Chinese)[2]	-0.89	1.36	-0.65	0.52
Adult Needs	-1.61	1.37	-1.18	0.24
df=5, intercept=8.37, r-sq=0.51, F=23.23, p<0.01				

Note. N (pre-test)=122, N (post-test)=119
[1] Boys=1, girls=0
[2] Consists of three groups, two created as dummy variables, the third is 'English'.

(vii) Adult Needs

Table 4.41 shows that 51% of the variance in considerateness-hostility was explained by the combined influence of the predictor variables (r-sq=0.51, F=23.23, $p<0.01$). *Adult needs* explained 1% of the variance in the response variable, however, this was not significant (t=-1.18, $p>0.05$).

4.4.1.6 Summary of considerateness-hostility behaviour

Of the background variables used in analyses, gender and language spoken at home have been shown consistently to be significant predictors of considerateness-hostility behaviour. It has been found that boys were less considerate than girls. Also, for home language, it appeared that children who spoke both English and Chinese at home were more considerate than children who spoke either English or Chinese at home.

The findings also indicated that total centre 'quality' was significantly associated with considerateness-hostility behaviour. On examining the effects of the subscales 'quality', only *personal care and routines*, *fine and gross motor activities* and *social development* contributed significantly to the variance in the outcome (4%, 3% and 2% respectively). Table 4.42 shows the summary of results obtained from tables 4.35 to 4.41. Figure 4.8 illustrates the findings

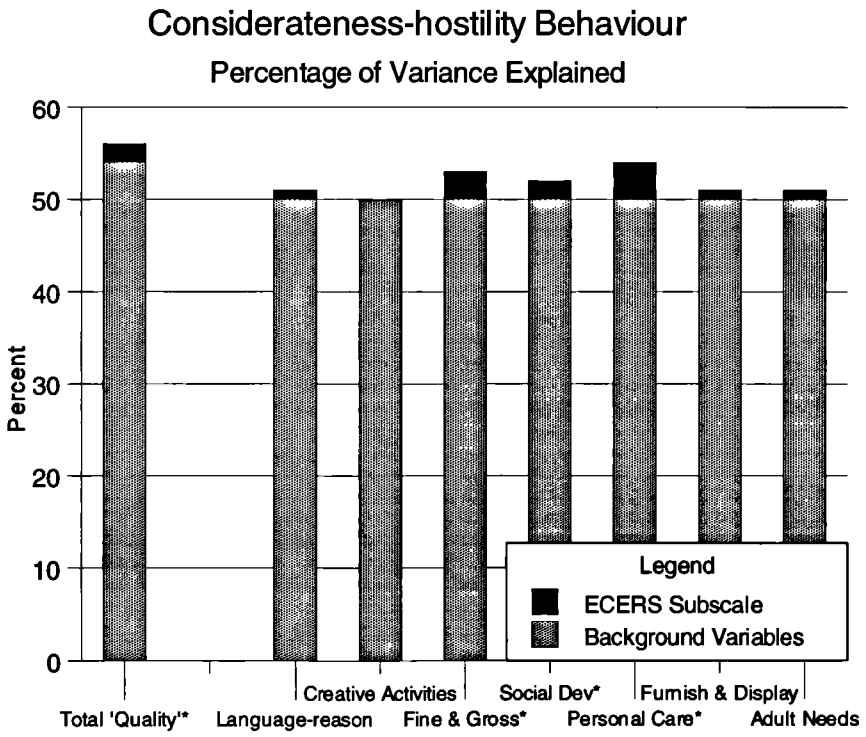
Table 4.42

Summary of Results from Tables 4.35 to 4.41

Percentage of Variance in Considerateness-hostility Post-scores Explained by ECERS Subscales

ECERS Subscales	R^2 Change (%)
Language-reasoning Experiences	1
Creative Activities	0.1
Fine & Gross Motor Activities	3*
Social Development	2*
Personal & Care Routines	4**
Furnishings & Display	1
Adult Needs	1

** p<0.01 * p<0.05



* significant predictor variable

Figure 4.8. Bar chart of variance in considerateness-hostility post-scores explained by total ECERS and subscales

4.4.2 Results of CBI Creativity/curiosity-apathy behaviour

4.4.2.1 Description of creativity/curiosity-apathy scores

Descriptive analysis of creativity/curiosity-apathy outcome scores showed that a higher mean of 11.68 was obtained at post-test compared with a mean score of 11.23 obtained at pre-test. Table 4.43 presents the means, standard deviations and range of scores. A t-test for dependent sample did not establish a significant difference between the two sets of scores ($t=0.49$, $p > 0.05$).

Table 4.43

Means, Standard Deviations and Range of Scores for Creativity/curiosity-apathy by Testing Stages

	Mean	S.D.	Range
Pre-test	11.23	6.77	-9 - 29
Post-test	11.68	7.06	-16 - 26

The distribution of scores was found to be normally distributed and a scatterplot, presented in figure 4.9, indicates a linear relationship between the pre-test and post-test ($r=0.50$. $p < 0.01$).

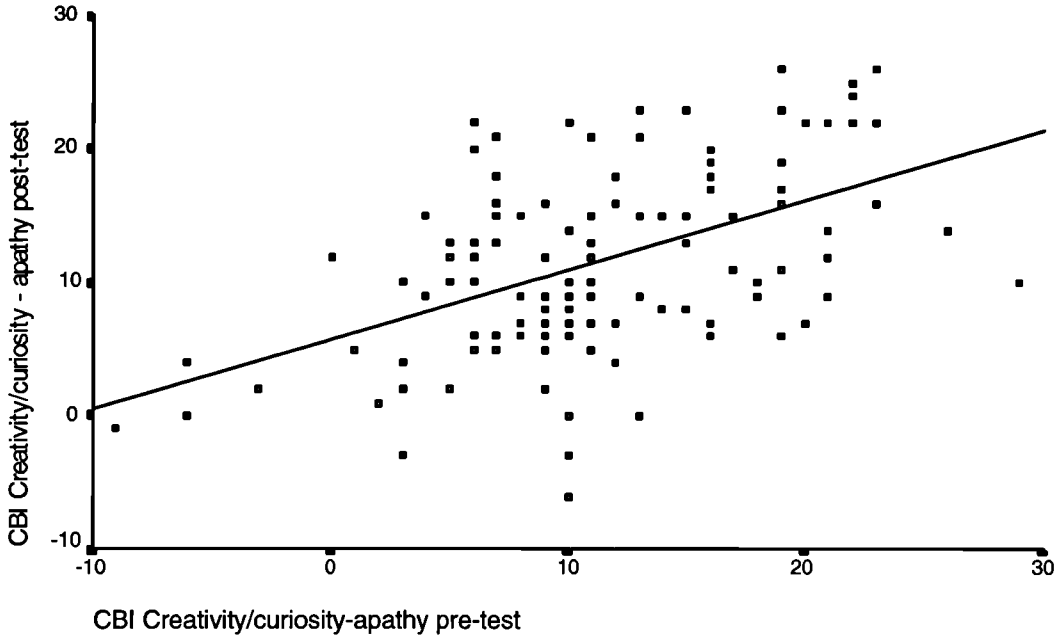


Figure 4.9. Scatter plot of CBI Creativity/curiosity-apathy pre-test and post-test scores

4.4.2.1 Centre effects on creativity/curiosity-apathy behaviour

Creativity/curiosity-apathy was regressed on pre-test, child characteristics and mother's education. The results, as presented in table 4.44, showed that the explanatory variables combined explain 31% of the variance in creativity/curiosity-apathy significantly .(r-sq=0.31, F=5.36, p<0.01). It is noted that the effect of mother's education approached significance (p=0.09) and the positive coefficient indicated that children with graduate mothers scored 2.61 points more than children with non-graduate mothers.

A second step in the regression analysis was conducted in which day care centres were entered next into the equation. The results, shown in table 4.45, indicated that there was a centre effect on creativity/curiosity-apathy scores. The centres explained 42% of the variance of creativity/curiosity-apathy scores (r-sq=0.42, F=8.17, p<0.01).

Table 4.44

Multiple Regression Analysis of Creativity/curiosity-apathy Post-scores on Pre-test, Child Characteristics and Mother's Education

Predictor variable	B	Error of B	T	P
Pre-test	0.43	0.10	4.44	<0.01*
Age	0.11	0.10	1.15	0.25
Gender[1]	0.85	1.23	0.69	0.49
Short form IQ	0.07	0.05	1.30	0.20
Time in care	-0.01	0.06	-0.12	0.91
Home language (English & Chinese)[2]	-0.95	0.10	-0.68	0.50
Home language (Chinese)[2]	-0.68	1.58	-0.43	0.67
Mother's education[3]	2.61	1.51	1.73	0.09
df=8, intercept=-7.97, r-sq=0.31, F=5.36, p<0.01				

Note. N (pre-test)=122, N (post-test)=119

[1] Boys=1, girls=0

[2] Consists of three groups, two created as dummy variables, the third is 'English'

[3] Graduate=1, non-graduate=0

Table 4.45

Multiple Regression Analysis (fixed order) of Creativity/curiosity-apathy Post-scores on Pre-test, Child Characteristics, Mother's Education and Day Care Centres

		R	R-square	Change in r-square	F	P
Step 1	Pre-test, Child characteristics, Mother's education	0.55	0.31	0.31	5.36	<0.01*
Step 2	Day care centres	0.85	0.72	0.42	8.17	<0.01*

4.4.2.3. Relationship between total centre 'quality' and creativity/curiosity-apathy behaviour

As centre effect was established, creativity/curiosity-apathy post scores were then regressed on total centre 'quality' score with pre-test, child characteristics and home background variables included. Table 4.46 presents the results of this regression analysis. Although, the significance level for centre 'quality' was more than 0.05 (t=1.86, p=0.06), the positive coefficient of 2.69 may indicate some educational importance. The r-square statistic showed that centre 'quality' explained 24% of the variance (r-sq=0.24, t=1.86, p=0.06) which was a substantial proportion of the total percentage of variance explained (r-sq=0.33, F=5.27, p<0.01).

Table 4.46

Multiple Regression Analysis of Creativity/curiosity-apathy Post-scores on Pre-test , Child Characteristics, Mother's Education and Centre 'Quality'

Predictor variable	B	Error of B	T	P
Pre-test	0.45	0.10	4.65	<0.01*
Age	0.12	0.10	1.24	0.22
Gender[1]	0.68	1.22	0.55	0.58
Short form IQ	0.08	0.05	1.46	0.15
Time in care	-0.005	0.05	-0.09	0.93
Home language (English & Chinese)[2]	-0.76	1.38	-0.55	0.58
Home language (Chinese)[2]	-0.14	1.58	-0.09	0.93
Mother's education[3]	1.60	1.58	1.01	0.31
Centre 'Quality'	2.69	1.45	1.86	0.06
df=9, intercept=-17.75, r-sq=0.33, F=5.27, p<0.01				

Note. N (pre-test)=122, N (post-test)=119

[1] Boys=1, girls=0

[2] Consists of three groups, two created as dummy variables, the third is 'English'.

[3] Graduate=1, non-graduate=0

4.4.2.4 Interactive effects on CBI Creativity-curiosity/apathy behaviour

Two interaction effects on creativity/curiosity-apathy post scores were investigated. The first looked at the effect of an interaction between centre 'quality' and mother's education. Predictor variables used in the analyses included pre-test, child characteristics, mother's education and the interaction variable. The results, shown in table 4.47, indicated a significant interaction effect of centre 'quality' and mother's education on creativity/curiosity-apathy ($t=2.34$, $p<0.05$). The interaction, as illustrated by figure 4.10, showed that the relationship between centre 'quality' and mother's education after adjusting for pre-test scores. The findings suggested that the effect of day care 'quality' was stronger for children with graduate mothers in higher 'quality' day care. However, progress for children of non-graduate mothers was essentially unaffected by day care 'quality'. One possible explanation for this is that children from non-stimulating homes require more than the moderate level 'quality' of environment found in Singapore. Thus, the small differences between low and moderate total scores is not sufficient to enhance children's creativity. However, given that the p-value for this interaction was marginal, it also possible that this interaction may have occurred by chance.

The second analysis explored the effect of the interaction between centre 'quality' and time in the day care centre. The results showed that the interaction was not significant ($t=0.21$, $p>0.05$).

Table 4.47

Multiple Regression Analysis of Creativity/curiosity-apathy Post-scores on Interaction between Centre 'Quality' and Mother's Education

Predictor variable	B	Error of B	T	P
Pre-test	0.49	0.10	5.12	<0.01*
Age	0.15	0.10	1.55	0.12
Gender[1]	0.89	1.20	0.74	0.46
Short form IQ	0.05	0.05	0.90	0.37
Time in care	-0.002	0.05	-0.04	0.97
Home language (English & Chinese)[2]	-0.56	1.36	-0.42	0.68
Home language (Chinese)[2]	-0.02	1.55	-0.01	0.99
Mother's education[3]	-23.76	10.97	-2.17	0.03*
Centre 'quality'	0.67	1.66	0.40	0.69
Centre 'quality' x mother's education	7.69	3.29	2.34	0.02*
df=10, intercept=-11.06, r-sq=0.37, F=5.51, p<0.01				

Note. N (pre-test)=122, N (post-test)=119

[1] Boys=1, girls=0

[2] Consists of three groups, two created as dummy variables, the third is 'English'.

[3] Graduate=1, non-graduate=0

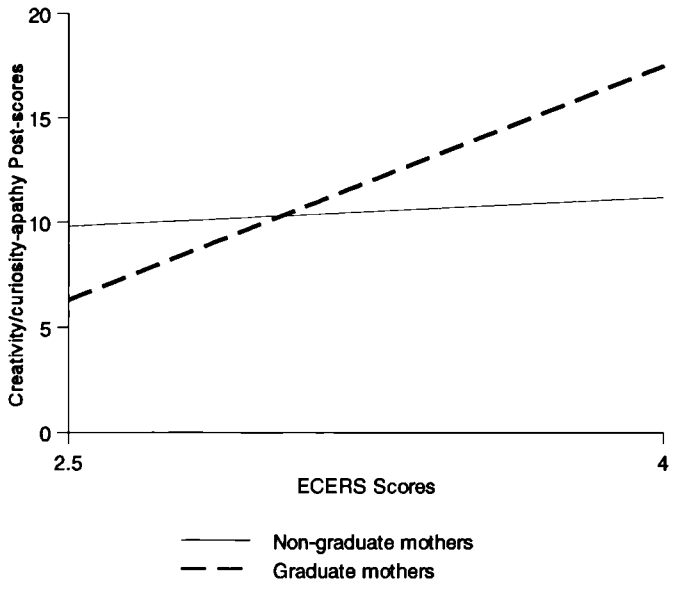


Figure 4.10. Line graph of the interaction between ECERS scores and mother's education on CBI Creativity/curiosity-apathy post-test scores with pre-test scores taken into account

4.4.2.5 Relationship between 'quality' subscales and creativity/curiosity-apathy behaviour

Further examination of the ECERS subscales and their relationship with creativity/curiosity-apathy progress was conducted. A concise model was used in which significant predictor variables obtained from previous analyses were included in the equation.

(i) Social Development

Table 4.48 shows that 29% of the variance in creativity/curiosity-apathy was explained by the combined influence of the explanatory variables (r-sq=0.29, F=23.72, p<0.01). *Social development* explained 4% of the variance in creativity/curiosity-apathy (r-sq=0.04, t=2.44, p<0.05).

Table 4.48

Concise Model of Multiple Regression Analysis of Creativity/curiosity-apathy Post-scores on Social Development

Predictor variable	B	Error of B	T	P
Pre-test	0.51	0.08	6.19	<0.01*
Social Development	2.33	0.95	2.44	0.02*
df=2, intercept=-0.22, r-sq=0.29, F=23.72, p<0.01				
Note. N (pre-test)=122, N (post-test)=119				

(ii) Language-reasoning Experiences

Table 4.49 shows that 36% of the variance in creativity/curiosity-apathy was explained by the combined influence of the predictor variables (r-sq=0.36, F=32.85, p<0.01). *Language-reasoning experiences* explained 11% of the variance in creativity/curiosity-apathy (r-sq=0.11, t=4.43, p<0.01).

Table 4.49

Concise Model of Multiple Regression Analysis of Creativity/curiosity-apathy Post-scores on Language-reasoning Experiences

Predictor variable	B	Error of B	T	P
Pre-test	0.53	0.08	6.87	<0.01*
Language-reasoning Experiences	2.17	0.49	4.43	<0.01*
df=2, intercept=-0.30, r-sq=0.36, F=32.85, p<0.01				
Note. N (pre-test)=122, N (post-test)=119				

(iii) Fine and Gross Motor Activities

Table 4.50 shows that 28% of the variance in creativity/curiosity-apathy was explained by the combined influence of the predictor variables (r-sq=0.28, F=22.70, p<0.01). *Fine*

and gross motor activities explained 3% of the variance in creativity/curiosity-apathy (r-sq=0.03, t=2.11, p<0.05).

Table 4.50

Concise Model of Multiple Regression Analysis of Creativity/curiosity-apathy Post-scores on Fine and Gross Motor Activities

Predictor variable	B	Error of B	T	P
Pre-test	0.54	0.08	6.56	<0.01*
Fine and Gross Motor Activities	2.35	1.12	2.11	0.04*
df=2, intercept=-3.09, r-sq=0.28, F=22.70, p<0.01				
Note. N (pre-test)=122, N (post-test)=119				

(iv) Creative Activities

Table 4.51 shows that 30% of the variance in creativity/curiosity-apathy was explained by the combined influence of the predictor variables (r-sq=0.30, F=24.89, p<0.01). *Creative activities* explained 5% (r-sq=0.05, t=2.78, p<0.01) of the variance in creativity/curiosity-apathy.

Table 4.51

Concise Model of Multiple Regression Analysis of Creativity/curiosity-apathy Post-scores on Creative Activities

Predictor variable	B	Error of B	T	P
Pre-test	0.55	0.08	6.76	<0.01*
Creative Activities	2.48	0.89	2.78	0.01*
df=2, intercept=-3.28, r-sq=0.30, F=24.89, p<0.01				
Note. N (pre-test)=122, N (post-test)=119				

(vi) Personal care and routines of Children

Table 4.52 shows that 28% of the variance in creativity/curiosity-apathy was explained by the combined influence of the predictor variables (r-sq=0.28, F=22.92, p<0.01). *Personal care and routines* explained 3% (r-sq=0.03, t=-2.18, p<0.05) of the variance in creativity/curiosity-apathy. However, it is noted that the coefficient is negative indicating the higher scores in *personal care and routines* subscale was associated with lower scores in creativity/curiosity-apathy.

Table 4.52

Concise Model of Multiple Regression Analysis of Creativity/curiosity-apathy Post-scores on Personal care and routines

Predictor variable	B	Error of B	T	P
Pre-test	0.56	0.08	6.69	<0.01*
Personal care and routines	-2.24	1.03	-2.18	0.03*
df=2, intercept=12.82, r-sq=0.28, F=22.92, p<0.01				
Note. N (pre-test)=122, N (post-test)=119				

(vi) Furnishings and Display for Children

Table 4.53 shows that 27% of the variance in creativity/curiosity-apathy was explained by the combined influence of the predictor variables (r-sq=0.27, F=21.22, p<0.01). *Furnishings and display* explained a non-significant proportion of variance (r-sq=0.01, t=1.50, p>0.05) in creativity/curiosity-apathy post scores.

Table 4.53

Concise Model of Multiple Regression Analysis of Creativity/curiosity-apathy Post-scores on Furnishings and Display

Predictor variable	B	Error of B	T	P
Pre-test	0.52	0.08	6.26	<0.01*
Furnishings and Display	1.18	0.79	1.50	0.14
df=2, intercept=2.53, r-sq=0.27, F=21.22, p<0.01				
Note. N (pre-test)=122, N (post-test)=119				

(vii) Adult Needs

Table 4.54 shows that 26% of the variance in creativity/curiosity-apathy was explained by the combined influence of the predictor variables (r-sq=0.26, F=20.07, p<0.01). *Adult needs* explained a non-significant proportion of variance (r-sq=0.003, t=-0.72, p>0.05) in creativity/curiosity-apathy.

Table 4.54

Concise Model of Multiple Regression Analysis of Creativity/curiosity-apathy Post-scores on Adult Needs

Predictor variable	B	Error of B	T	P
Pre-test	0.53	0.08	6.33	<0.01*
Adult Needs	-1.06	1.47	-0.72	0.47
df=2, intercept=8.98, r-sq=0.26, F=20.07, p<0.01				
Note. N (pre-test)=122, N (post-test)=119				

4.4.2.6 Summary of creativity/curiosity-apathy progress

The results of the analyses indicated that centre 'quality' was a positive explanatory variable for creativity/curiosity-apathy behaviour. Although not statistically significant,

the regression coefficient of 2.69 indicated that it can be of educational importance indicating that higher centre 'quality' may facilitate creative and curious behaviour. An interactive effect was found between centre 'quality' and mother's education. This suggested that the relationship between centre 'quality' and mother's education was stronger and favoured the children with graduate mothers on progress in creativity/curiosity. The interaction also showed that higher day care 'quality' had little effect on children with non-graduate mothers which is contrary to findings of previous studies. This results seemed unlikely and it is possible that this interaction was spurious.

On examining the subscales of the centre 'quality' variable, it has been found that *language-reasoning experiences* explained the most (11%.) variance in the outcome. This was followed by *creative activities* (5%) and *social development* (4%). *Fine and gross motor activities* and *personal care and routines* explained 3% of the variance (refer to table 4.55). However, it is noted that *personal care and routines* was found to be a negative explanatory variable for creativity/curiosity-apathy. This meant that higher scores in the subscale was associated with less creativity/curiosity behaviour. Figure 4.11 illustrates a summary of these results obtained from tables 4.48 to 4.54.

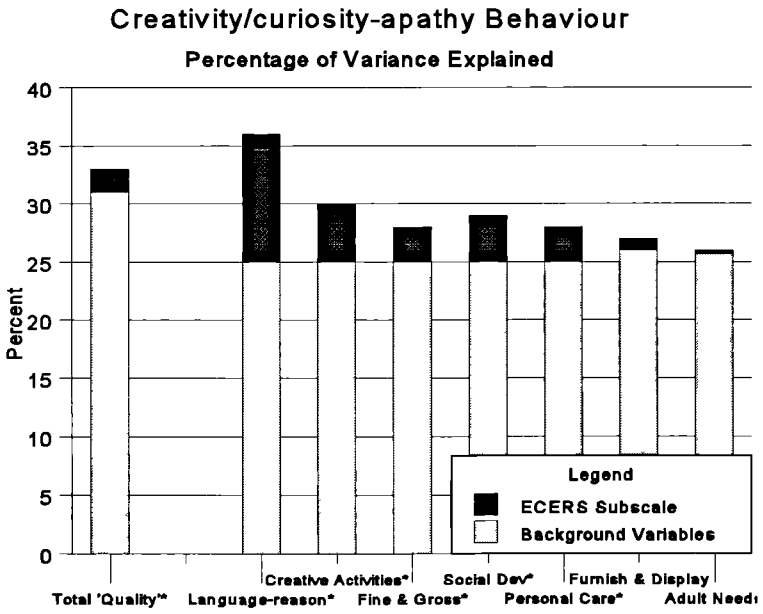
Table 4.55

Summary of Results from Tables 4.48 to 4.54

Percentage of Variance in Creativity/curiosity-apathy Explained by ECERS Subscales

ECERS Subscales	R^2 Change (%)
Language-reasoning Experiences	11**
Creative Activities	5*
Fine & Gross Motor Activities	3*
Social Development	4*
Personal & Care Routines	3*
Furnishings & Display	1
Adult Needs	0.3

** $p<0.01$ * $p<0.05$



* significant predictor variable

Figure 4.11. Bar chart of variance in creativity/curiosity-apathy progress explained by total ECERS and subscales

4.4.3 Results of CBI Extraversion-introversion behaviour

4.4.3.1 Description of extraversion-introversion scores

A mean score obtained at pre-test was 14.52 and a lower mean of 12.98 was obtained at post-test level. Table 4.56 shows the results of this analysis. A t-test for dependent sample showed a significant difference between the mean scores ($t=-3.65$, $p<0.01$) in which post-test decreased by 1.79.

Table 4.56

Means, Standard Deviations and Range of Scores for Extraversion-introversion Behaviour by Testing Stages

	Mean	S.D.	Range
Pre-test	14.52	6.66	-3 - 26
Post-test	12.98	6.74	-2 - 26

The distribution was found to be within the normal range and a linear relationship ($r=0.68$, $p<0.01$) between pre-test and post-test is shown in figure 4.12.

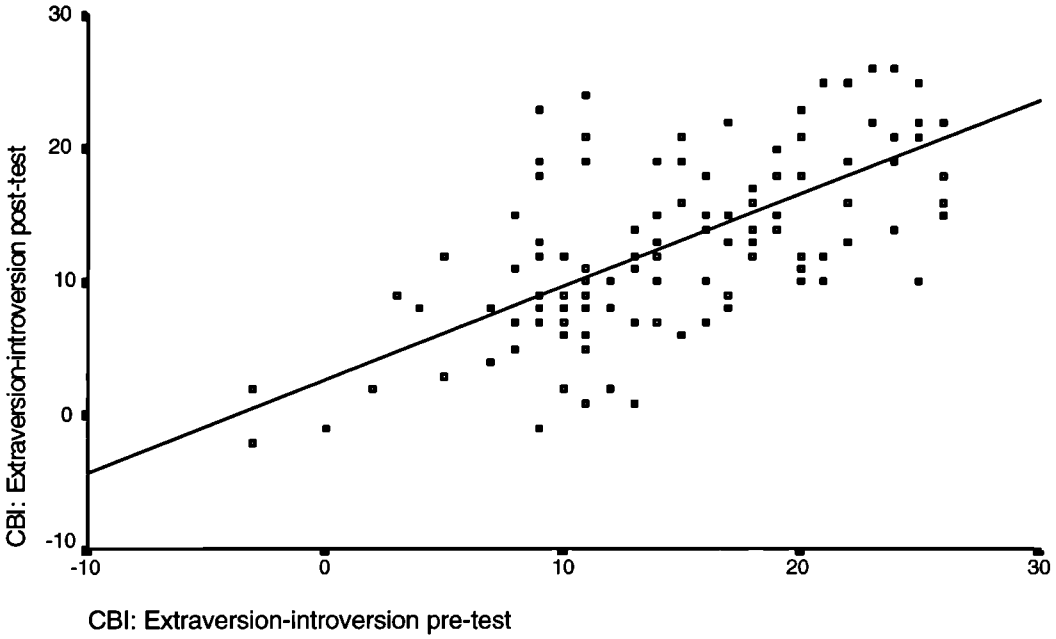


Figure 4.12. Scatterplot of CBI Extraversion-introversion pre-test and post-test scores

4.4.3.2. Centre effects on extraversion-introversion behaviour

Extraversion-introversion was investigated in relation to pre-test, child characteristics and mother's education in the first step of this analysis. The outcome was regressed on the composite of predictor variables shown in table 4.57. Results showed that the combined variables explained 43% of the variance in extraversion-introversion post-scores (r-sq=0.43, F=9.12, df=8, $p<0.01$). However, it is noted that individual variables, except pre-test, did not show any significant effects on the outcome.

Table 4.57

Multiple Regression Analysis of Extraversion-introversion Post-scores on Pre-test, Child Characteristics and Mother's Education

Predictor variable	B	Error of B	T	P
Pre-test	0.67	0.08	8.06	<0.01*
Age	0.02	0.08	0.22	0.83
Gender[1]	-0.50	1.03	-0.48	0.63
Short form IQ	0.04	0.04	0.95	0.35
Time in care	-0.07	-0.13	-1.46	0.15
Home language (English & Chinese)[2]	0.52	1.16	0.45	0.65
Home language (Chinese)[2]	0.13	1.31	0.10	0.92
Mother's education[3]	-0.43	1.24	-0.34	0.73
df=8, intercept=-0.63, r-sq=0.43, F=9.12, p<0.01				

Note. N (pre-test)=122, N (post-test)=119

[1] Boys=1, girls=0

[2] Consists of three groups, two created as dummy variables, the third is 'English'

[3] Graduate=1, non-graduate=0

The second step in the analysis involved entering day care centres into the equation by creating dummy variables. The combined effect of the centres on extraversion-introversion, with pre-test, child characteristics and mother's education included, is presented in table 4.58. The r-square and change in r-square at each step is reported and showed a significant centre effect on the outcome, explaining 15% of the variance (r-sq=0.15, F=1.97, p<0.05).

Table 4.58

Multiple Regression Analysis (fixed order) of Extraversion-introversion Post-scores on Pre-test, Child Characteristics, Mother's Education and Day Care Centres

		R	R-square	Change in r-square	F	P
Step 1	Pre-test, Child characteristics, Mother's education	0.66	0.43	0.43	9.12	<0.01*
Step 2	Day care centres	0.76	0.58	0.15	1.97	0.03*

4.4.3.3 Relationship between total centre 'quality' and extraversion-introversion behaviour

Based on the above finding that there was a significant centre effect on extraversion-introversion post-scores, an analysis was conducted using total centre 'quality' as predictor variable. Table 4.59 presents the results of this analysis and the findings indicated that total centre 'quality' was not a significant predictor variable ($t=0.54$, $p>0.05$).

Table 4.59

Multiple Regression Analysis of Extraversion-introversion Post-scores on Pre-test, Child Characteristics, Mother's Education and Centre 'Quality'

Predictor variable	B	Error of B	T	P
Pre-test	0.66	0.08	7.84	<0.01*
Age	0.02	0.08	0.24	0.81
Gender[1]	-0.53	1.04	-0.52	0.61
Short form IQ	0.04	0.04	0.10	0.32
Time in care	-0.07	0.05	-1.43	0.16
Home language (English & Chinese)[2]	0.58	1.17	0.50	0.62
Home language (Chinese)[2]	0.24	1.33	0.18	0.86
Mother's education[3]	-0.64	1.31	-0.49	0.63
Centre 'Quality'	0.66	1.24	0.54	0.60
df=9, intercept=-3.02, r-sq=0.43, F=8.08, p<0.01				

Note. N (pre-test)=122, N (post-test)=119
[1] Boys=1, girls=0
[2] Consists of three groups, two created as dummy variables, the third is 'English'
[3] Graduate=1, non-graduate=0

4.4.3.4 Interactive effects on extraversion-introversion behaviour

The effects of two interaction on extraversion-introversion were investigated. The first examined the effect of the interaction between centre 'quality' and mother's education which were found to be non-significant (t=1.33, p>0.05). The second analysis investigated the effect of the interaction of centre 'quality' and time spent at the day care centre which was also found to be non-significant (t= -0.86, p>0.05).

4.4.3.5 Relationship between 'quality' subscales and extraversion-introversion progress

Analysis was conducted with each ECERS subscales as explanatory variables. A concise model was used in which significant variables obtained from previous analysis were

included.

(i) Fine and Gross Motor Activities

Table 4.60 shows that 49% of the variance in extraversion-introversion was explained by the combined influence of the predictor variables (r-sq=0.49, F=54.79, p<0.01). *Fine and gross motor activities* explained 3% of the variance in extraversion-introversion (r-sq=0.03, t=2.59, p<0.05).

Table 4.60

Concise Model of Multiple Regression Analysis of Extraversion-introversion Post-scores on Fine and Gross Motor Activities

Predictor variable	B	Error of B	T	P
Pre-test	0.69	0.07	10.04	<0.01*
Fine and Gross Motor Activities	2.33	0.90	2.59	0.01*
df=2, intercept=-5.77, r-sq=0.49, F=54.79, p<0.01				
Note. N (pre-test)=122, N (post-test)=119				

(ii) Language-reasoning Experiences

Table 4.61 shows that 47% of the variance in extraversion-introversion was explained by the combined influence of the predictor variables (r-sq=0.47, F=50.59, p<0.01). *Language-reasoning experiences* explained a non-significant percentage of the variance in extraversion-introversion (r-sq=0.01, t=1.47, p>0.05).

Table 4.61

Concise Model of Multiple Regression Analysis of Extraversion-introversion Post-scores on Language-reasoning Experiences

Predictor variable	B	Error of B	T	P
Pre-test	0.69	0.07	9.31	<0.01*
Language-reasoning Experiences	0.65	0.44	1.47	0.15
df=2, intercept=1.29, r-sq=0.47, F=50.59, p<0.01				
Note. N (pre-test)=122, N (post-test)=119				

(iii) Social Development

Table 4.62 shows that 46% of the variance in extraversion-introversion was explained by the combined influence of the predictor variables (r-sq=0.46, F=49.47, p<0.01). *Social development* explained a non-significant percentage of the variance in extraversion-introversion (r-sq=0.004, t=0.96, p>0.05).

Table 4.62

Concise Model of Multiple Regression Analysis of Extraversion-introversion Post-scores on Social Development

Predictor variable	B	Error of B	T	P
Pre-test	0.68	0.07	9.31	<0.01*
Social Development	0.79	0.82	0.96	0.34
df=2, intercept=0.87, r-sq=0.46, F=49.47, p<0.01				
Note. N (pre-test)=122, N (post-test)=119				

(iv) Creative Activities

Table 4.63 shows that 46% of the variance in extraversion-introversion was explained by the combined influence of the predictor variables (r-sq=0.46, F=48.79, p<0.01). *Creative*

activities explained a non-significant percentage of the variance in extraversion-introversion (r-sq=0.01, t=0.42, p>0.05).

Table 4.63

Concise Model of Multiple Regression Analysis of Extraversion-introversion Post-scores on Creative Activities

Predictor variable	B	Error of B	T	P
Pre-test	0.69	0.07	9.70	<0.01*
Creative Activities	0.33	0.75	0.42	0.67
df=2, intercept=1.61, r-sq=0.46, F=48.79, p<0.01				
Note. N (pre-test)=122, N (post-test)=119				

(v) Personal care and routines of Children

Table 4.64 shows that 46% of the variance in extraversion-introversion was explained by the combined influence of the predictor variables (r-sq=0.46, F=49.87, p<0.01). *Language-reasoning experiences* explained a non-significant percentage of the variance in extraversion-introversion (r-sq=0.01, t=-1.17, p>0.05).

Table 4.64

Concise Model of Multiple Regression Analysis of Extraversion-introversion Post-scores on Personal care and routines

Predictor variable	B	Error of B	T	P
Pre-test	0.71	0.07	9.99	<0.01*
Personal care and routines	-0.99	0.84	-1.17	0.24
df=2, intercept=5.81, r-sq=0.46, F=49.87, p<0.01				
Note. N (pre-test)=122, N (post-test)=119				

(vi) Furnishings and Display for Children

Table 4.65 shows that 46% of the variance in extraversion-introversion was explained by the combined influence of the predictor variables (r-sq=0.46, F=48.69, p<0.01). *Furnishings and display* explained a non-significant percentage of the variance in extraversion-introversion (r-sq=0.0004, t=-0.28, p>0.05).

Table 4.65

Concise Model of Multiple Regression Analysis of Extraversion-introversion Post-scores on Furnishings and Display

Predictor variable	B	Error of B	T	P
Pre-test	0.70	0.07	9.79	<0.01*
Furnishings and Display	-0.18	0.66	-0.28	0.78
df=2, intercept=3.14, r-sq=0.46, F=48.69, p<0.01				
Note. N (pre-test)=122, N (post-test)=119				

(vii) Adult Needs

Table 4.66 shows that 46% of the variance in extraversion-introversion was explained by the combined influence of the predictor variables (r-sq=0.46, F=50.16, p<0.01). *Adult needs* explained a non-significant percentage of the variance in extraversion-introversion (r-sq=0.01, t=-1.30, p>0.05).

Table 4.66

Concise Model of Multiple Regression Analysis of Extraversion-introversion Post-scores on Adult Needs

Predictor variable	B	Error of B	T	P
Pre-test	0.70	0.07	10.00	<0.01*
Adult Needs	-1.54	1.19	-1.30	0.20
df=2, intercept=7.45, r-sq=0.46, F=50.16, p<0.01				
Note. N (pre-test)=122, N (post-test)=119				

4.4.3.6 Summary of extraversion-introversion behaviour

In summary, the findings indicated that extraversion-introversion post-scores were not positively associated with centre 'quality' after the effects of pre-test, child characteristics and mother's education were partialled out. Except for *fine and gross motor activities*, all the other subscales of the ECERS were not found to have a significant influence on this social-emotional outcome. A summary of the results from tables 4.60 to 4.66 is shown in table 4.67. It shows that *fine and gross motor activities* explained 3% of the variance in extraversion-introversion progress significantly. Figure 4.13 illustrates these results.

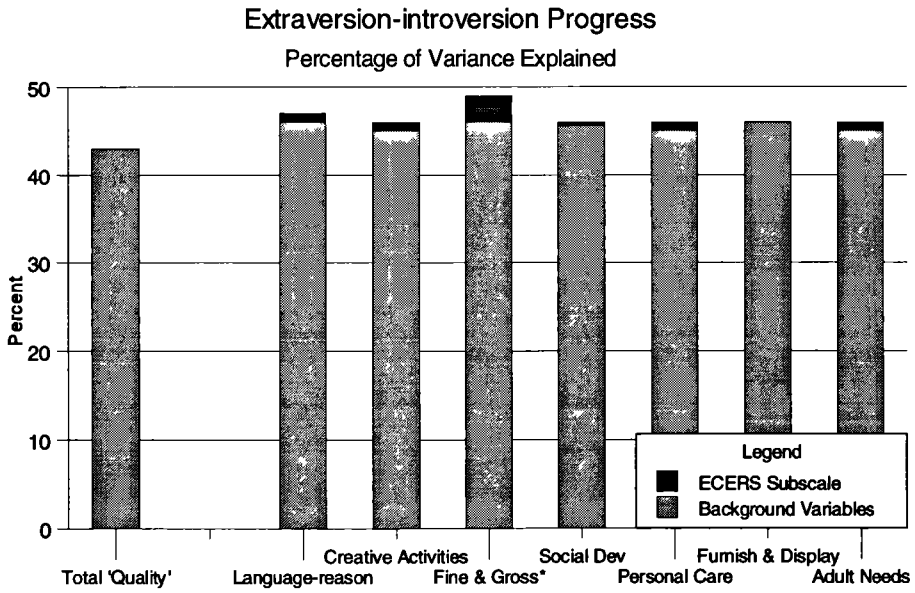
Table 4.67

Summary of Results from Tables 4.60 to 4.66

Percentage of Variance in Extraversion-introversion Explained by ECERS Subscales

ECERS Subscales	R^2 Change (%)
Language-reasoning Experiences	1
Creative Activities	1
Fine & Gross Motor Activities	3*
Social Development	0.4
Personal & Care Routines	1
Furnishings & Display	0.04
Adult Needs	1

* $p<0.05$



* significant predictor variable

Figure 4.13. Bar chart of variance in extraversion-introversion progress explained by total ECERS and subscales

4.4.4 Results of CBI Independence-dependence behaviour

4.4.4.1 Description of independence-dependence scores

A mean of 11.48 was obtained for pre-test of independence-dependence subscale of the CBI and a higher mean of 12.06 was obtained for the post-test. Table 4.68 shows the descriptive results of this outcome and includes standard deviations and range of scores. A t-test for dependent samples was conducted and results showed no significant difference ($t=1.01$, $p>0.05$) between the mean scores.

Table 4.68

Means, Standard Deviations and Range of Scores for Independence-dependence by Testing Stages

	Mean	S.D.	Range
Pre-test	11.48	6.45	-3 - 26
Post-test	12.06	6.88	-7 - 25

The distribution of scores was normally distributed and a scatterplot in figure 4.14 presents a linear relationship between the pre-test and post-test ($r=0.63$, $p<0.01$). One outlier was identified and subsequently omitted in further analysis.

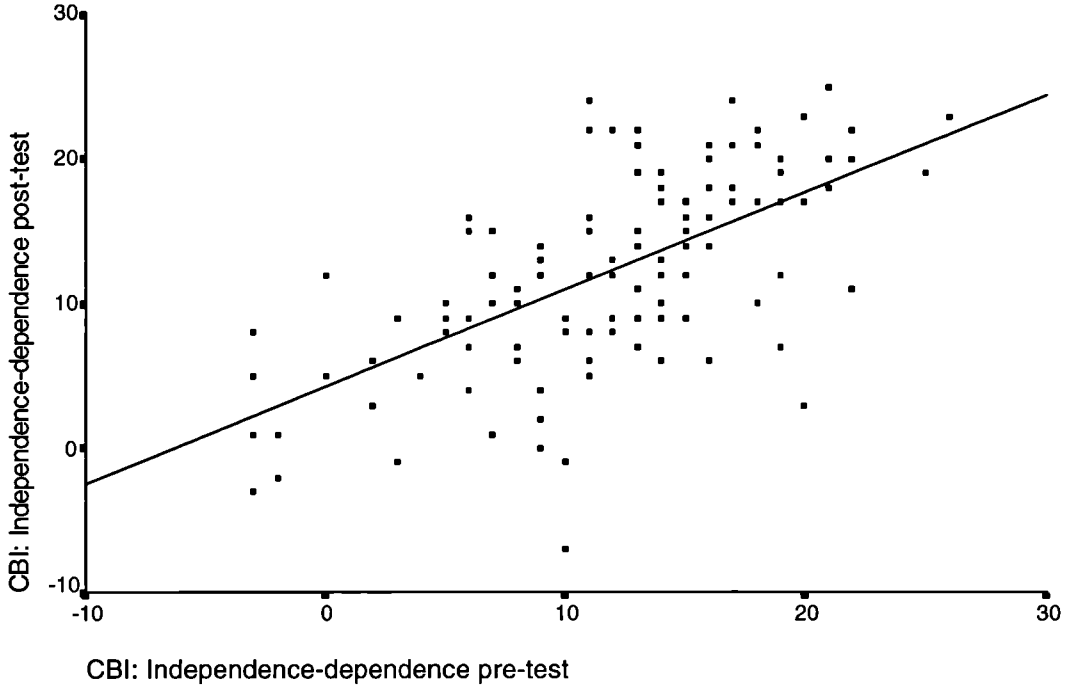


Figure 4.14. Scatterplot of CBI Independence-dependence pre-test and post-test scores

4.4.4.2 Centre effects on independence-dependence behaviour

A regression analysis was conducted on independence-dependence outcome to investigate a centre effect. Independence-dependence scores were regressed on pre-test, child characteristics and mother's education in the first step. Table 4.69 presents the results of the analysis. The findings indicated that the combined predictor variables significantly explained 54% of the variance in independence-dependence post-scores (r-sq=0.54, $F=14.06$, $p<0.01$). The analysis also showed that IQ was positively associated with the response variable and this was significant ($t=2.18$, $p<0.05$). However, it is noted that the coefficient, 0.09, was small.

Table 4.69

Multiple Regression Analysis of Independence-dependence Post-scores on Pre-test Scores, Child Characteristics and Mother's Education

Predictor variable	B	Error of B	T	P
Pre-test	0.64	0.08	7.86	<0.01*
Age	-0.02	0.08	-0.20	0.84
Gender[1]	-0.36	0.95	-0.38	0.71
Short form IQ	0.09	0.04	2.18	0.03*
Time in care	0.05	0.04	1.26	0.21
Home language (English & Chinese)[2]	1.58	1.08	1.46	0.15
Home language (Chinese)[2]	1.86	1.22	1.53	0.13
Mother's education[3]	1.24	1.19	1.04	0.30
df=8, intercept=-6.36, r-sq=0.54, F=14.06, p<0.01				

Note. N (pre-test)=122, N (post-test)=119

[1] Boys=1, girls=0

[2] Consists of three groups, two created as dummy variables, the third is 'English'

[3] Graduate=1, non-graduate=0

The second step in the analysis involved entering the 16 day care centres into the equation as dummy variables. Table 4.70 shows the r-square, change in r-square and their respective F statistics for each step. The results showed a significant centre effect on independence-dependence outcome with 12% of its variance explained by centres (r-sq=0.12, F=1.94, p<0.05).

Table 4.70

Multiple Regression Analysis (fixed order) of Independence-dependence Post-scores on Pre-test Child Characteristics, Mother's Education and Day Care Centres

		R	R-square	Change in r-square	F	P
Step 1	Pre-test, Child characteristics, Mother's education	0.73	0.54	0.54	14.02	<0.01*
Step 2	Day Care centres	0.81	0.66	0.12	1.94	0.03*

Table 4.71

Multiple Regression Analysis of Independence-dependence Post-scores on Pre-test, Child Characteristics, Mother's Education and Centre 'Quality'

Predictor variable	B	Error of B	T	P
Pre-test	0.64	0.08	7.85	<0.01*
Age	-0.01	0.08	-0.15	0.89
Gender[1]	-0.44	0.96	-0.46	0.65
Short form IQ	0.09	0.04	2.26	0.03*
Time in care	0.06	0.04	1.29	0.20
Home language [2] (English & Chinese)	1.65	1.09	1.52	0.13
Home language[2] (Chinese)	2.08	1.24	1.67	0.10
Mother's education[3]	0.86	1.25	0.69	0.49
Centre 'Quality'	1.10	1.13	0.97	0.33
df=9, intercept=-10.38, R-sq=0.54, F=12.60, p<0.01				

Note. N (pre-test)=122, N (post-test)=119

[1] Boys=1, girls=0

[2] There are three groups, two dummy variables are entered into the equation. The third is 'English'.

[2] Graduate=1, non-graduate=0

4.4.4.3 Relationship between total centre 'quality' and independence-dependence behaviour

As a centre effect on independence-dependence progress has been demonstrated, centre 'quality' as measured by ECERS was used as a predictor variable. Table 4.71 presents the results of this analysis and shows that centre 'quality' did not predict the outcome significantly ($t=0.97$, $p>0.05$). IQ remained a significant predictor ($t=2.26$, $p<0.05$).

4.4.4.4 Interactive effects on independence-dependence behaviour

The effects of two interactions on independence-dependence progress were investigated. The first analysis examined the effects of the interaction between centre 'quality' and mother's education. The results showed a non-significant relationship of this interaction with the outcome measure ($t=0.67$, $p>0.05$). The second analysis investigated the effect of the interaction between centre 'quality' and time spent in the day care centre. The results showed that this interaction was also not significant ($t=0.46$, $p>0.05$).

4.4.4.5 Relationship between 'quality' subscales and independence-dependence behaviour

Further investigations were conducted into possible relationships between ECERS subscales and independence-dependence outcomes. A concise model for regression was adopted in which only those predictor variables which were previously found to be significantly associated with independence-dependence were included.

(i) Language-reasoning Experiences

Table 4.72 shows that 48% of the variance in independence-dependence outcome was explained by the combined influence of the predictor variables (r-sq=0.48, F=34.76, p<0.01). *Language-reasoning experiences* explained 2% of the variance in independence-dependence outcome (r-sq-0.02, t=1.94, p=0.06).

Table 4.72

Concise Model of Multiple Regression Analysis of Independence-dependence Post-scores on Language-reasoning

Predictor variable	B	Error of B	T	P
Pre-test	0.60	0.07	8.41	<0.01*
Short-form IQ	0.11	0.04	2.73	0.01*
Language-reasoning Experiences	0.83	0.43	1.94	0.06*
df=3, intercept=-8.65, r-sq=0.48, F=34.76, p<0.01				

Note. N (pre-test)=122, N (post-test)=119

(ii) Social Development

Table 4.73 shows that 48% of the variance in independence-dependence was explained by the combined influence of the predictor variables (r-sq=0.48, F=35.12, p<0.01). *Social development* explained 2% of the variance in independence-dependence and this was significant (r-sq=0.02, t=2.08, p<0.05).

Table 4.73

Concise Model of Multiple Regression Analysis of Independence-dependence Post-scores on Social Development

Predictor variable	B	Error of B	T	P
Pre-test	0.60	0.07	8.42	<0.01*
Short-form IQ	0.11	0.04	2.71	0.01*
Social Development	1.63	0.78	2.08	0.04*
df=3, intercept=-10.53, r-sq=0.48, F=35.12, p<0.01				
Note. N (pre-test)=122, N (post-test)=119				

(iii) Fine and Gross Motor Activities

Table 4.74 shows that 47% of the variance in independence-dependence was explained by the combined influence of the predictor variables (r-sq=0.47, F=33.84, p<0.01). *Fine and gross motor activities* explained 1% of the variance in independence-dependence but this was not significant (r-sq=0.01, t=1.50, p>0.05).

Table 4.74

Concise Model of Multiple Regression Analysis of Independence-dependence Post-scores on Fine/Gross Motor Activities

Predictor variable	B	Error of B	T	P
Pre-test	0.61	0.07	8.43	0.00*
Short form IQ	0.11	0.04	2.72	0.00*
Fine/Gross Motor Activities	1.37	0.91	1.50	0.14
df=3, intercept=-11.50, r-sq=0.47, F=33.84, p<0.01				
Note. N (pre-test)=122, N (post-test)=119				

(iv) Creative Activities

Table 4.75 shows that 47% of the variance in independence-dependence was explained by the combined influence of the predictor variables (r-sq=0.47, F=33.42, p<0.01). *Creative activities* explained 1% of the variance in independence-dependence but this was not significant (r-sq=0.01, t=1.26, p>0.05).

Table 4.75

Concise Model of Multiple Regression Analysis of Progress in Independence-dependence on Creative Activities

Predictor variable	B	Error of B	T	P
Pre-test	0.62	0.07	8.62	<0.01*
Short-form IQ	0.11	0.04	2.68	<0.01*
Creative Activities	0.94	0.74	1.26	0.29
df=3, intercept=-9.75, r-sq=0.47, F=33.42, p<0.01				
Note. N (pre-test)=122, N (post-test)=119				

(v) Personal care and routines of Children

Table 4.76 shows that 47% of the variance in independence-dependence was explained by the combined influence of the predictor variables (r-sq=0.47, F=33.10, p<0.01). *Personal care and routines* explained a non-significant percentage of the variance in independence-dependence (r-sq=0.005, t=-1.03, p>0.05).

Table 4.76

Concise Model of Multiple Regression Analysis of Independence-dependence Post-scores on Personal care and routines

Predictor variable	B	Error of B	T	P
Pre-test	0.62	0.07	8.58	<0.01*
Short-form IQ	0.11	0.04	2.68	0.01*
Personal care and routines	-0.86	0.83	-1.03	0.30
df=3, intercept=-3.61, r-sq=0.47, F=33.10, p<0.01				
Note. N (pre-test)=122, N (post-test)=119				

(vi) Furnishings and Display for Children

Table 4.77 shows that 46% of the variance in independence-dependence was explained by the combined influence of the predictor variables (r-sq=0.46, F=32.61, p<0.01). *Furnishings and display* explained a non-significant percentage of variance in independence-dependence (r-sq=0.001, t=0.52, p>0.05).

Table 4.77

Concise Model of Multiple Regression Analysis of Independence-dependence Post-scores on Furnishings and Display

Predictor variable	B	Error of B	T	P
Pre-test	0.61	0.07	8.37	<0.01*
Short-form IQ	0.11	0.04	2.64	0.01*
Furnishing and Display	0.34	0.65	0.52	0.60
df=3, intercept=-7.20, r-sq=0.46, F=32.61, p<0.01				
Note. N (pre-test)=122, N (post-test)=119				

(vii) Adult Needs

Table 4.78 shows that 46% of the variance in independence-dependence was explained by the combined influence of the predictor variables (r-sq=0.46, F=32.44, p<0.01). *Adult needs* was not a significant predictor variable for independence-dependence outcome (r-sq=0.00003, t=-0.08, p>0.05).

Table 4.78

Concise Model of Multiple Regression Analysis of Independence-dependence Post-scores on adults Needs

Predictor variable	B	Error of B	T	P
Pre-test	0.62	0.07	8.52	<0.01*
Short-form IQ	0.11	0.04	2.62	0.01*
Adult Needs	-0.09	1.20	-0.08	0.94
df=3, intercept=-5.98, r-sq=0.46, F=32.44, p<0.01				

Note. N (pre-test)=122, N (post-test)=119

4.4.4.6 Summary of independence-dependence behaviour

In general, of the background variables analysed, only IQ was established as a significant predictor variable indicating a positive relationship. This meant that an increase in IQ was associated with an increase in independence progress.

The results of the analyses indicated that centre 'quality' was not a significant predictor variable for independence-dependence outcome. Only two subscales in the centre 'quality' variable, social development and language-reasoning experiences contributed significantly to the variance in this social-emotional behaviour (2% each). Refer to table 4.79 for a summary of the results. Figure 4.15 illustrates the findings.

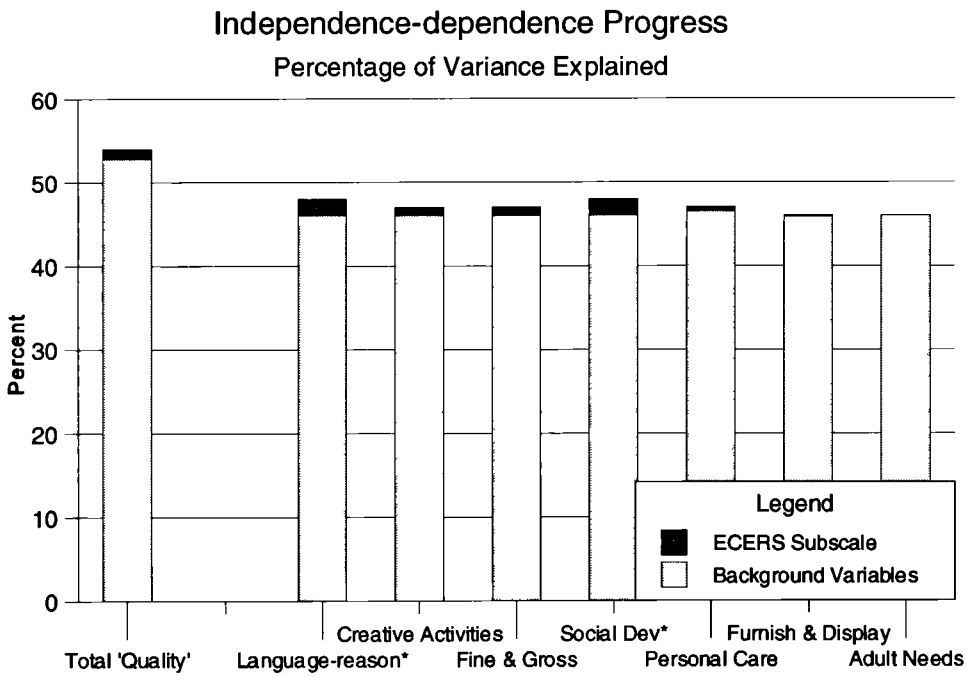
Table 4.79

Summary of Results from Tables 4.72 to 4.78

Percentage of Variance in Independence-dependence Explained by ECERS Subscales

ECERS Subscales	R^2 Change (%)
Language-reasoning Experiences	2+
Creative Activities	1
Fine & Gross Motor Activities	1
Social Development	2*
Personal & Care Routines	0.5
Furnishings & Display	0.1
Adult Needs	0.003

* $p<0.05$ + $p<0.10$



* significant predictor variable

Figure 4.15. Bar chart of variance in independence progress explained by total ECERS and subscales

4.4.5 Results of perceived competence

4.4.5.1 Description of perceived competence scores

As the scores obtained were negatively skewed, medians and interquartile ranges are presented in table 4.80. The median score obtained at pre-test for perceived competence was 7.17 and a median of 7.00 was obtained at post-test. A Wilcoxon Matched-pairs Sign-rank test did not establish a significant difference between the two scores ($z=-0.48$, $p>0.05$).

Table 4.80

Medians and Interquartile Ranges of Scores for Perceived Competence by Testing Stage

	Median	1st Quartile	3rd Quartile
Pre-test	7.17	6.5	7.83
Post-test	7.00	6.5	7.67

A square transformation was conducted on the post-test scores. A scatterplot, presented in figure 4.16, shows a linear relationship between the pre-test and squared post-test ($r=0.40$, $p<0.01$) scores.

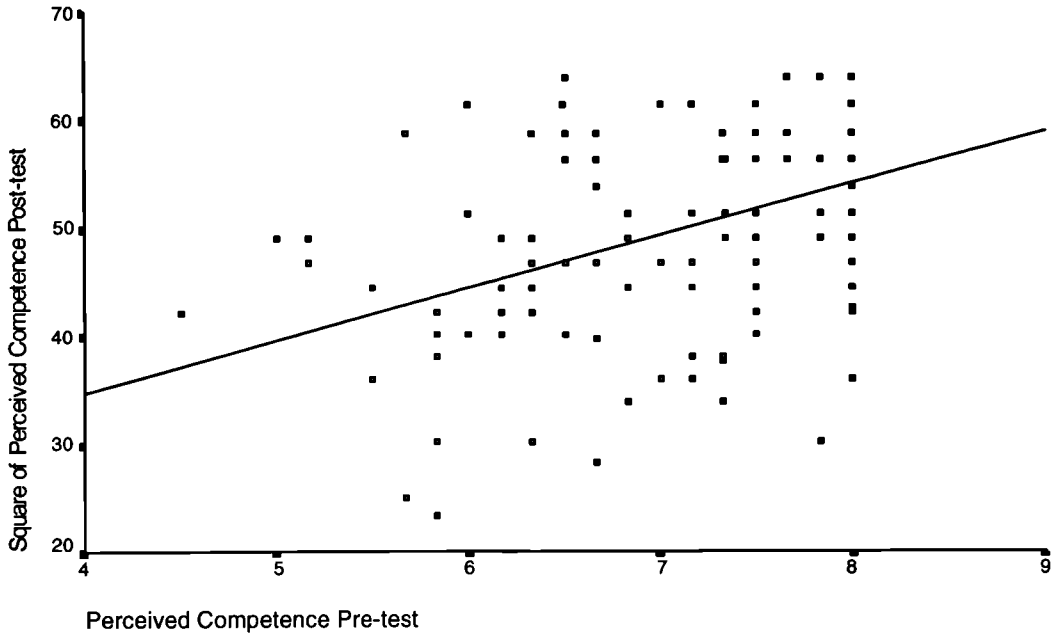


Figure 4.16. Scatterplot of perceived competence pre-test and squared post-test scores

4.4.5.2 Centre effects on perceived competence post-scores

A multiple regression analysis of perceived competence was conducted with pre-test scores, child characteristics and mother's education included. The findings, as presented in table 4.81, showed that 22% of the variance in perceived competence was explained by the explanatory variables combined (r-sq=0.22, F=3.39, $p<0.01$). However, with the exception of pre-test, none of the other variables were significantly associated with the outcome.

Table 4.81

Multiple Regression Analysis of Perceived Competence Post-scores on Pre-test, Child Characteristics and Mother's Education

Predictor variable	B	Error of B	T	P
Pre-test	4.30	1.13	3.81	<0.01*
Age	0.07	0.15	0.51	0.61
Gender[1]	-1.08	1.83	-0.59	0.55
Short form IQ	0.09	0.08	1.14	0.26
Time in care	0.04	0.08	0.46	0.65
Home language (English & Chinese)[2]	-3.52	2.03	-1.73	0.09
Home language (Chinese)[2]	-1.16	2.29	-0.51	0.61
Mother's education[3]	-0.68	2.16	-0.31	0.75
df=8, intercept=6.52, r-sq=0.22, F=3.39, p<0.01				

Note. N (pre-test)=122, N (post-test)=118

[1] Boys=1, girls=0

[2] Consists of three groups, two created as dummy variables, the third is 'English'

[3] Graduate=1, non-graduate=0

Table 4.82 presents the second step in this analysis in which the effects of pre-test, child characteristics and mother's education were partialled out. The findings showed that day care centres explained 17% of the variance in perceived competence (r-sq=0.17, F=1.48, p>0.05). Although this was not significant, it is noted that centres explained a relatively large proportion of the total variance of 39% which may indicate some importance.

Table 4.82

Multiple Regression Analysis (fixed order) of Perceived Competence Post-scores on Pre-test, Child Characteristics, Mother's Education and Day Care Centres

		R	R-square	Change in r-square	F	P
Step 1	Pre-test, Child characteristics, Mother's education	0.47	0.22	0.22	3.39	<0.01*
Step 2	Day Care centres	0.62	0.39	0.17	1.48	0.13

As a centre effect on perceived competence was not established, further analyses on centre 'quality' effects were not conducted.

4.4.6 Results of social acceptance

4.4.6.1 Description of social acceptance scores

A mean score of 6.34 was obtained at pre-test and a mean score of 6.16 at post-test. Table 4.83 presents the results of means, standard deviations and range of scores. A t-test of dependent samples indicated no significant difference between the two scores (t=-1.85, df=117, p>0.05).

Table 4.83

Means, Standard Deviations and Range of Scores for Social Acceptance by Testing Stage

	Mean	S.D.	Range
Pre-test	6.34	1.04	3.33 - 8
Post-test	6.16	0.99	3.83 - 8

The distribution of the scores were normally distributed. The relationship between pre-test and post-test is a linear one (r=0.48, p<0.01) and this is presented in the scatterplot in figure.

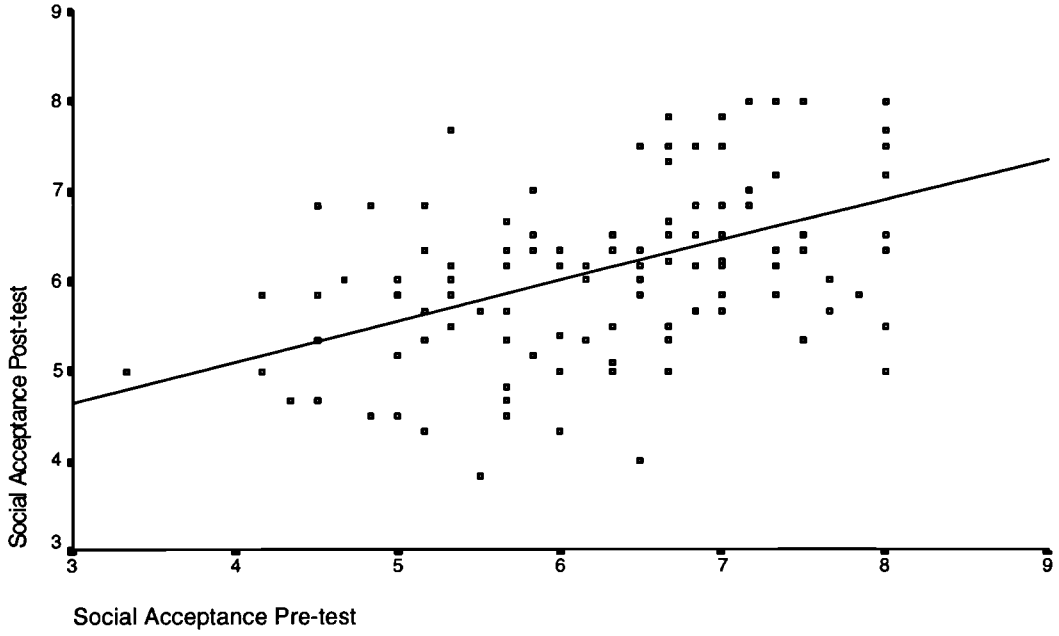


Figure 4.17. Scatterplot of social acceptance pre-test and post-test scores

4.4.6.2 Centre effect on social acceptance

A multiple regression analysis was conducted on social acceptance with pre-test scores, child characteristics and mother's education included. The findings, as presented in table 4.84, showed that 25% of the variance in social acceptance was explained by the explanatory variables combined (r-sq=0.25, F=4.05, p<0.01). However, with the exception of pre-test, none of the individual variables were significantly associated with the outcome.

Table 4.84

Multiple Regression Analysis of Social Acceptance Post-scores on Pre-test, Child Characteristics and Home Background Variables

Predictor variable	B	Error of B	T	P
Pre-test	0.40	0.09	4.65	<0.01*
Age	-0.01	0.01	-0.90	0.37
Gender[1]	-0.16	0.18	-0.88	0.38
Short form IQ	-0.01	0.01	-0.77	0.44
Time in care	-0.004	0.01	-0.47	0.64
Home language (English & Chinese)[2]	-0.25	0.20	-1.23	0.22
Home language (Chinese)[2]	-.0.12	0.23	-0.54	0.59
Mother's education[3]	-0.03	0.21	-0.12	0.91
df=8, intercept=-5.31, r-sq=0.25, F=4.05, p<0.01				

Note. N (pre-test)=122, N (post-test)=118
[1] Boys=1, girls=0
[2] Consists of three groups, two created as dummy variables, the third is 'English'
[3] Graduate=1, non-graduate=0

A second step in this analysis, involved entering day care centres, as dummy variables, into the equation. Table 4.85 shows the two step analysis in which the results showed that day care centres explained 17% of the variance in social acceptance but this was not significant (r-sq=0.17, F=1.61. p>0.05).

Table 4.85

Multiple Regression Analysis (fixed order) of Social Acceptance Post-scores on Pre-test, Child Characteristics, Mother's Education and Day Care Centres

		R	R-square	Change in r-square	F	P
Step 1	Pre-test, Child characteristics, Mother's education	0.50	0.25	0.25	4.05	<0.01*
Step 2	Day are centres	0.65	0.42	0.17	1.61	0.09

As centre effect was not established in the above analysis, further analyses on centre 'quality' effects were not conducted.

4.7 Summary of the results of the effects of the day care environment on social-emotional progress

A significant moderate effect of total centre 'quality' was obtained for progress in considerateness and creativity/curiosity. With reference to table 4.86, a one unit increase in centre 'quality' was associated with an increase of 2.60 (b-value) in raw score for considerateness and this was a moderate effect. This was the same with creativity and curiosity in that a one unit increase in centre 'quality' was associated with an increase in 2.69 (b-value) in raw score. Of the two outcomes, centre 'quality' was more significant in its effect on considerateness.

In examining the associations between outcomes and ECERS subscales, different subscales were found to have significant effects on different social-emotional outcomes. For considerateness, the subscales, *social development, fine and gross motor activities* and *personal care/routines* appeared to have significant moderate to large effects (see footnote 1). Better 'quality' in the *social development* aspect of the day care environment provided opportunities for free play, a variety of small and large group activities, cultural awareness and adult guidance in interaction between children. It may be that these opportunities promote more considerateness and cooperation among children in the centre. Similarly, centres were rated higher if there were opportunities for indoor and outdoor games that can promote cooperative play. *Personal care routines* was rated higher if there was more interaction between staff and children during the domestic part

of the day, as in having a meal together, cleaning up and getting ready for nap. This part of the day lends itself to helping each other and perhaps sharing in routine tasks that can promote cooperation and understanding.

Creativity/curiosity reflects children's interest, enthusiasm and active participation in classroom activities. The subscale analyses indicated that all the subscales except for *furnishings and display* and *adult needs* significantly affected children's development of creativity and curiosity. The magnitude of effects ranged from moderate to large as seen in table 4.86, with *language-reasoning experiences* (ES=0.33) having the largest effect followed by *creative activities* (ES=0.23). Better provision of *language-reasoning* and *creative activities* mean more experiences for children that involve exploring and discovering in open-ended tasks and play activities. There can also be more opportunities for decision-making, problem-solving and expression of ideas. These experiences can promote progress in creativity and curiosity and thus support learning.

The other subscales, *social development, fine and gross motor activities* and *personal care routines*, were also significant predictors of creativity and curiosity but they were relatively weakly associated with (range of ES=0.17-0.19) these social-emotional qualities compared with *language-reasoning* and *creative experiences.* It is interesting to note that a negative relationship was found with *personal care routines* in which the better 'quality' in this aspect of the day care environment, the less progress was found in creativity and curiosity. This meant that with every one unit increase in the 'quality' of personal care, progress in creativity and curiosity decreased by 2.24 (b-value) in raw score. The magnitude of this effect was moderate (ES=-0.17). Perhaps intrinsic in better provision

of personal and care in the day care centres was also more supervision and guidance from adults which may not give more opportunities for independence in decision-making and problem-solving.

Only one subscale, *fine and gross motor activities*, had a significant and moderate effect (ES=0.17) on extravert behaviour. A possible explanation can be that better opportunities for physical activities like games and outdoor play encouraged outgoing behaviour and social confidence especially in play. A small to moderate effect on independence was obtained from the subscales, *social development* and *language-reasoning activities. Social development* was a stronger (ES=0.14) explanatory variable than language-reasoning experiences (ES=0.13). Better 'quality' of *social development* in the day care environment provides an atmosphere conducive to free play, group projects and more opportunities to be alone. These may promote concentration, task orientation and independence in children.

A centre effect was not obtained for perceived competence and social acceptance. A possible explanation for this may be that there are variables other than day care centres that are associated with this outcome. A possible suggestion, noted in table 4.81, is home language which approached statistical significance in its influence on perceived competence (t=-1.73, p=0.09).

The general finding from background variables was that gender (ES=-0.17) had a significant but small effect (refer to footnote 1) on considerateness-hostility post-scores indicating that boys appeared to be less considerate than girls. Also, speaking two

languages at home had a small (ES=-0.15) effect on considerateness favouring children who spoke English and Chinese at home. There was a tendency for children with graduate mothers to be more creative and curious than children with non-graduate mothers. A small effect (ES=0.09) was also obtained from IQ on independence indicating that the higher the IQ score the more independent the child. It should be noted that these effects are over and above the effects of pre-test scores which would 'contain' such background aspects of the child.

Table 4.86

The Effects of Total and ECERS Subscales 'Quality' on Social-emotional Outcomes

		Social-emotional Outcomes			
Predictor Variables		Considerateness -hostility	Creativity/curiosity -apathy	Extraversion -introversion	Independence -dependence
Total 'Quality'	B	2.60*	2.69+	n.s.	n.s.
	Effect size[1]	0.15*	0.17+		
Language-reasoning experiences	B	n.s.	2.17**	n.s.	0.83+
	Effect size		0.33**		0.13+
Creative activities	B	n.s.	2.48**	n.s.	n.s.
	Effect size		0.23**		
Furnishings & display	B	n.s.	n.s.	n.s.	n.s.
	Effect size				
Social development	B	2.08*	2.33*	n.s.	1.63*
	Effect size	0.16*	0.19*		0.14*
Fine & gross motor	B	2.71*	2.35*	2.33*	n.s.
	Effect size	0.17*	0.17*	0.17*	
Personal & care routines	B	2.88**	-2.24*	n.s.	n.s.
	Effect size	0.20**	-0.17*		
Adult needs	B	n.s.	n.s.	n.s.	n.s.
	Effect size				

Note. Centre effects were not established for perceived competence and social acceptance.

[1] beta weights

+ $p<0.10$ * $p<0.05$ ** $p<0.01$

Part Two

4.8 Descriptive results of home background

Information about children's home background was obtained to investigate the effect it had on their progress. Home background was assessed along two dimensions, home activities and parental values. Home activities consisted of information about the frequency of mother's reading with child and frequency of using academic workbooks for extra lessons at home. Parental values measured parents rating on child-rearing values.

Table 4.87 shows the frequencies with which mothers read to their children at home. The findings indicated that most mothers (44.3%) read with their children two to six times a week. This was followed by 35.3% of the mothers who read with their children once a week or less and 18% who read with their children everyday.

Table 4.87

Frequency of Mothers Reading with their Children at Home

Frequency Label	Frequency	Percent
Once a week or less	43	35.3
Two-six times a week	54	44.3
Everyday	22	18.0
Non-respondents	3	2.5

Note. N=122

Table 4.88 shows the findings of how much time mothers spend teaching their children through the use of academic workbooks. The results showed that more than half of the mothers used the workbooks once a week or less (54.9%). Mothers who used the

workbooks twice a week or more consisted of 40.2% of the sample.

Table 4.88

Frequency of Mothers Using Academic Workbooks with their Children

Frequency Label	Frequency	Percent
Once a week or less	67	54.9
Twice a week or more	49	40.2
Non-respondents	6	4.9

Note. N=122

Table 4.89 presents the descriptive results of parental values. Parents in the sample appeared to rank conformity as the most important value for their children (mean=19.46). This was followed by self-direction, which had a mean of 16.45. The least valued was social behaviour in which a mean of 9.09 was obtained.

Table 4.89

Means, Standard Deviations and Range of Scores for Parental Values

	Mean	S.D.	Range
Conformity	19.46	3.76	10 -27
Self-direction	16.45	4.49	9 - 27
Social	9.09	2.61	3 - 15

Note. N=120

4.9 Relationship between language progress and home background

This section involves regression of each child outcome on three types of predictors; pre-test, child characteristics and home background. For each child outcome, two tables are presented, one that shows the change in r-square with each set of predictors and the other

shows the regression coefficient for individual variables. This is to explore how much each block of predictors contributed to explaining the variance of each response variable. Mother's education was entered last in the analysis because of its established predictability and also to examine the strength of influence from home background with and without the effects of mother's education. This procedure allows the effect of home background to be investigated, after adjusting for pre-test and then to investigate whether mother's education had an additional effect after taking account of both pre-test and home background.

4.9.1 Effects of home background on verbal fluency progress

Home background as represented by home activities and parental values were investigated in relation to verbal fluency. Table 4.90 presents the results of a fixed order regression analysis in which r-square, change in r-sq and their respective F values are reported. The findings indicated that pre-test and child characteristics together contributed significantly to the variance of verbal fluency. However, home activities and parental values explained 6% of the variance in verbal fluency and this was not significant ($F=1.44$, $p>0.05$). It is also noted that mother's education approached statistical significance (r-sq=0.03, $F=3.12$, $p<0.10$) in contributing to the variance after the effects of home background was partialled out.

Table 4.90

Multiple Regression Analysis of Progress in Verbal Fluency on Pre-test, Child Characteristics and Home Background

		R	R-square	Change in r-square	F	P
Step 1	Pre-test, Child characteristics	0.44	0.20	0.20	3.25	<0.01*
Step 2	Home activities & Parental values	0.51	0.26	0.06	1.44	0.22
Step 3	Mother's education	0.53	0.28	0.03	3.12	0.08

Table 4.91 shows each predictor variable in the regression equation. The findings indicated that pre-test, child characteristics and home background combined explain 28% of the variance in verbal fluency (r-sq=0.28, df=13, F=2.64, p<0.01). Except for pre-test, all other explanatory variables were not significantly associated with progress in verbal fluency. It is noted that frequency of reading at home approached statistical significance in its association. The positive regression coefficient suggested that the more time spent reading with children at home the higher the score in verbal fluency.

Table 4.91

Multiple Regression Analysis of Progress in Verbal Fluency on Pre-test, Child Characteristics, and Home Background

Predictor variable	B	Error of B	T	P
Pre-test	0.52	0.44	4.22	<0.01*
Age	-0.004	0.05	-0.09	0.93
Gender[1]	-0.24	0.62	-0.39	0.70
Short form IQ	-0.00	0.03	-0.02	0.99
Time in care	0.004	0.03	0.16	0.87
Home language[2] (English & Chinese)	-0.14	0.70	-0.20	0.84
Home language[2] (Chinese)	0.02	0.81	0.02	0.98
Home reading	0.24	0.14	1.66	0.10
Home workbook	0.13	0.20	0.66	0.51
Parental values				
conformity	0.38	0.35	1.09	0.28
self-direction	0.40	0.34	1.16	0.25
social	0.46	0.36	1.26	0.21
Mother's education[3]	1.37	0.78	1.77	0.08
df=13, intercept=-12.89, r-sq=0.28, F=2.64, p<0.01				

Note. N (pre-test)=122, N (post-test)=118

[1] Boys=1, girls=0

[2] There are three groups, two dummy variables are entered into the equation The third group is 'English'

[3] Graduate=1, non-graduate=0

4.9.2 Effects of home background on word reading progress

Table 4.92 presents the results of a regression analysis investigating the effects of home background on word reading. The findings indicated that pre-test and child characteristics contributed significantly to the variance of word reading. However, home activities and parental values explained 3% of the variance in word reading and this was not significant (r-sq=0.03, F=1.61, p>0.05). Mother's education was also not a significant explanatory variable for word reading.

Table 4.92

Multiple Regression Analysis of Progress in Word Reading on Pre-test, Child Characteristics and Home Background

		R	R-square	Change in r-square	F	P
Step 1	Pre-test, Child characteristics	0.81	0.65	0.65	21.56	<0.01*
Step 2	Home activities & Parental values	0.83	0.68	0.03	1.61	0.17
Step 3	Mother's education	0.83	0.68	0.002	0.78	0.38

Table 4.93 presents all the explanatory variables and the findings indicated that the variables combined explain 68% of the variance in word reading progress significantly (r-sq=0.68, df=14, F=13.32, p<0.01). However, none of the home activities and parental values individually was significantly associated with word reading.

Time in care was shown to be a consistent significant contributor to explaining variance in word reading. The regression coefficient, although small, indicated a positive association between increased time spent in day care centre and greater progress in word reading progress.

Table 4.93

Multiple Regression Analysis of Progress Word Reading on Pre-test, Child Characteristics, and Home Background

Predictor variable	B	Error of B	T	P
Pre-test	0.22	0.03	8.14	<0.01*
Sq pre-test	-0.002	0.00	-5.06	<0.01*
Age	-0.02	0.02	-0.78	0.44
Gender[1]	0.03	0.26	0.10	0.92
Short form IQ	0.01	0.01	0.78	0.44
Time in care	0.03	0.01	2.41	0.02*
Home language[2] (English & Chinese)	0.22	0.29	0.75	0.46
Home language[2] (Chinese)	-0.18	0.34	-0.53	0.60
Home reading	0.05	0.06	0.77	0.45
Home workbook	-0.12	0.08	-1.47	0.15
Parental values				
conformity	-0.04	0.14	-0.31	0.76
self-direction	-0.06	0.14	-0.40	0.69
social	0.06	0.15	0.37	0.71
Mother's education[3]	0.30	0.33	0.88	0.38
df=14, intercept=3.38, r-sq=0.68, F=13.32, p<0.01				

Note. N (pre-test)=122, N (post-test)=118

[1] Boys=1, girls=0

[2] There are three groups, two dummy variables are entered into the equation The third group is 'English'

[3] Graduate=1, non-graduate=0

4.9.3. Effects of home background on verbal comprehension progress

The effect of home background variables on verbal comprehension progress was investigated in a regression analysis (see table 4.94). The findings indicated that after pre-test and child characteristics were partialled out, home activities and parental values contributed significantly to 8% of the variance of verbal comprehension (r-sq=0.08, F=2.89, p<0.05). Results also indicated that mother's education contributed significantly

to the variance (4%) in verbal comprehension (r-sq=0.04, t=2.75, p<0.05).

Table 4.94

Multiple Regression Analysis of Progress in Verbal Comprehension on Pre-test, Child Characteristics and Home Background

		R	R-square	Change in r-square	F	P
Step 1	Pre-test, Child characteristics	0.64	0.42	0.42	9.44	<0.01*
Step 2	Home activities & Parental values	0.71	0.50	0.08	2.89	0.02*
Step 3	Mother's education	0.73	0.54	0.04	7.55	0.01*

Table 4.95 shows the importance of individual explanatory variables in the regression analysis. The findings indicated that child characteristics, home background and mother's education combined explained 54% of the variance in verbal comprehension significantly (r-sq=0.54, df=13, F=7.79, p<0.01). In examining each variable in the equation, it is noted that parental values were found to be significantly associated with verbal comprehension.

Table 4.95

Multiple Regression Analysis of Progress in Verbal Comprehension on Pre-test, Child Characteristics, Home Background

Predictor variable	B	Error of B	T	P
Pre-test	0.26	0.04	5.97	<0.01*
Age	0.03	0.02	1.68	0.10
Gender[1]	-0.10	0.21	-0.48	0.63
Short form IQ	-0.00	0.01	-0.01	0.99
Time in care	0.004	0.01	0.41	0.68
Home language[2] (English & Chinese)	-0.07	0.24	-0.28	0.78
Home language[2] (Chinese)	-0.42	0.29	-1.45	0.15
Home reading	0.05	0.05	1.11	0.27
Home workbook	-0.06	0.07	-0.91	0.37
Parental values				
conformity	0.36	0.12	3.05	<0.01*
self-direction	0.39	0.12	3.32	<0.01*
social	0.39	0.12	3.13	<0.01*
Mother's education[3]	0.73	0.27	2.75	0.01*
df=13, intercept=-0.48, r-sq=0.54, F=7.79, p<0.01				

Note. N (pre-test)=122, N (post-test)=118

[1] Boys=1, girls=0

[2] There are three groups, two dummy variables are entered into the equation The third group is 'English'

[3] Graduate=1, non-graduate=0

4.9.4 Summary of the effects of home background on language progress

The results indicated that home background was a significant predictor for progress in verbal comprehension but not so for verbal fluency and word reading. With reference to table 4.96, the findings indicated that parental values had a significant and large effect (refer to footnote 1) on verbal comprehension. In comparing the three parental values, self-direction had the largest magnitude of effect (ES=1.28) and this was followed by

conformity (ES=1.00) and social skills (ES=0.72). Parents who placed importance in being self-directed preferred their children to think for themselves, be responsible for their own work and be interested in many things. Children of parents with these values showed best progress in verbal comprehension in children. Perhaps this suggests that a home environment where children were given opportunities to make their own decisions were more able to understand instructions and respond in meaningful ways.

Parents who valued conformity were, perhaps, parents who preferred their children to obey them and their teachers, be good students and be organised. Children from this home environment showed better progress in verbal comprehension than children from homes that valued social skills. But these children from a more structured home environment made less progress compared to children from homes that valued self-directedness.

These values were the next strong association with verbal comprehension perhaps indicating that their home environment was more structured and responses can be less personally meaningful. Parents who valued social skills had the least strength of association with higher scores in verbal comprehension.

Also, in looking at verbal fluency progress (refer to table 4.96), frequency of reading at home approached significance in its effectiveness in enhancing this outcome. The finding indicated that with one unit increase in frequency of children reading at home with their parent, performance in verbal fluency increased by 0.24 in raw score (b-value). The magnitude of this effect (ES=0.19) was moderate.

In general, it is not surprising that few effects of home background were found. This is because it is likely that pre-test score would have already accounted for the effects of various factors in the home background. The significant findings established in this section indicated that the effects of frequency of reading at home and parental values were over and above what was accounted for by pre-test.

Table 4.96

The Effects of Home Background on Language Outcomes

		Language Outcomes		
Predictor Variables		Verbal Fluency	Word Reading	Verbal Comprehension
Home reading	B	0.24+	n.s.	n.s.
	Effect size	0.19+		
Home work	B	n.s.	n.s.	n.s.
	Effect size			
Conformity value	B	n.s.	n.s.	0.36**
	Effect size			1.00**
Social value	B	n.s.	n.s.	0.39**
	Effect size			0.72**
Self-direction value	B	n.s.	n.s.	0.39**
	Effect size			1.28**

[1] beta weights
+p <0.10 * p<0.05 ** p<0.01

4.10 Relationship between social-emotional behaviour and home background

4.10.1 Effects of home background on considerateness-hostility behaviour

Home background was investigated in relation to considerateness-hostility. The results in table 4.97 show the regression including the three sets of explanatory variables. Pre-test, child characteristics, home activities and parental values were entered into the regression equation with mother's education entered last. The findings indicated that home activities and parental values explained 5% of the variance in considerateness-hostility and that the effect of these variables collectively approached significance (r-sq=0.05, F=2.20, p=0.06). It is noted the mother's education explained 2% of the variance and this also approached significance (t=1.88, p=0.06).

Table 4.97

Multiple Regression Analysis of Progress in Considerateness-hostility Post-scores, Child Characteristics and Home Background

		R	R-square	Change in r-square	F	P
Step 1	Pre-test, Child characteristics	0.73	0.53	0.53	15.02	<0.01*
Step 2	Home activities & Parental values	0.76	0.58	0.05	2.20	0.06
Step 3	Mother's education	0.77	0.60	0.02	3.54	0.06

Table 4.98 shows the individual explanatory variables in this regression analysis. The combined influence of these variables explained 60% of the variance in considerateness-hostility post-scores (r-sq=0.60, F=10.00, p<0.01). On examining individual explanatory variables, gender was found to be significantly associated with the outcome (t=-2.40, p<0.05) as in the analysis with home background variables (refer to table 4.32). Boys scored less in considerateness-hostility compared with the girls. Home language also

remained a significant explanatory variable, after including home background variables, with children who spoke both languages at home scoring higher in considerateness-hostility (t=2.09. p<0.05) than children who spoke one language at home. Social value was also established as a significant predictor variable of considerateness-hostility (t=2.01, p<0.05). This was a positive association which meant that an increase in social value was related with an increase in considerateness-hostility post-scores.

Table 4.98

Multiple Regression Analysis of Considerateness-hostility Post-scores on Pre-test, Child Characteristics, and Home Background

Predictor variable	B	Error of B	T	P
Pre-test	0.64	0.07	8.57	<0.01*
Age	0.10	0.09	1.17	0.25
Gender[1]	-2.76	1.15	-2.40	0.02*
Short form IQ	0.04	0.05	0.80	0.42
Time in care	0.03	0.05	0.53	0.59
Home language[2] (English & Chinese)	2.76	1.32	2.09	0.04*
Home language[2] (Chinese)	0.01	1.51	0.01	0.99
Home reading	-0.96	0.27	-0.36	0.72
Home workbook	-0.25	0.37	-0.07	0.95
Parental values				
conformity	0.50	0.65	0.77	0.44
self-direction	0.79	0.64	1.22	0.23
social	1.35	0.67	2.01	0.05*
Mother's education[3]	2.79	1.48	1.88	0.06
df=13, intercept=-42.91, r-sq=0.60, F=10.00, p<0.01				

Note. N (pre-test)=122, N (post-test)=119

[1] Boys=1, girls=0

[2] There are three groups, two dummy variables are entered into the equation The third group is 'English'

[3] Graduate=1, non-graduate=0

4.10.2 Effects of home background on creativity/curiosity-apathy behaviour

Table 4.99 shows the results of the fixed order regression analysis on creativity/curiosity-apathy outcome. The findings indicated that pre-test and child characteristics explained 30% of the variance of creativity/curiosity-apathy significantly (r-sq=0.30, F=5.62, p<0.01). Home activities and parental values explained 7% of the variance in the outcome but this was not significant (r-sq=0.07, F=1.82, p>0.05). Mother's education was also not significant in its contribution to explaining variance in creativity/curiosity-apathy post-scores (r-sq=0.02, t=1.20, p>0.05). .

Table 4.99

Multiple Regression Analysis of Creativity/curiosity-apathy Post-scores on Child Characteristics and Home Background

		R	R-square	Change in r-square	F	P
Step 1	Pre-test, Child characteristics	0.54	0.30	0.30	5.62	<0.01*
Step 2	Home activities & Parental values	0.60	0.36	0.07	1.82	0.12
Step 3	Mother's education	0.61	0.37	0.01	1.44	0.23

Table 4.100 shows all the explanatory variables used in this analysis. The combined influence of the variables explained 37% of the variance in creativity/curiosity-apathy (r-sq=0.37, F=3.98, p<0.01). With the exception of pre-test, none of the other variables were significantly associated with creativity/curiosity-apathy post-scores. However, it is noted that home activities approached statistical significance in contributing to the variance of creativity/curiosity. For frequency of reading with children at home, there was a positive relationship with creativity/curiosity post-scores. This meant that the more time parents spent reading with children, the higher the scores in creativity/curiosity. On the

other hand, there was a negative relationship with frequency of doing home work. The findings appeared to indicate that the more home work children did, the less they scored on creativity/curiosity.

Table 4.100

Multiple Regression Analysis of Creativity/curiosity-apathy Post-scores on Pre-test, Child Characteristics and Home Background

Predictor variable	B	Error of B	T	P
Pre-test	0.43	0.10	4.44	<0.01*
Age	0.14	0.10	1.36	0.18
Gender[1]	1.49	1.30	1.15	0.25
Short form IQ	0.06	0.06	1.02	0.31
Time in care	-0.003	0.06	-0.06	0.95
Home language[2] (English & Chinese)	-0.89	1.50	-0.59	0.56
Home language[2] (Chinese)	-0.89	1.72	-0.52	0.61
Home reading	0.54	0.30	1.78	0.08
Home workbook	-0.74	0.42	-1.78	0.08
Parental values				
conformity	-0.93	0.74	-1.26	0.21
self-direction	-0.93	0.73	-1.27	0.21
social	-1.07	0.76	-1.40	0.16
Mother's education[3]	2.03	1.69	1.20	0.23
df=17, intercept=48.601, r-sq=0.37, F=3.98, p<0.01				

Note. N (pre-test)=122, N (post-test)=119

[1] Boys=1, girls=0

[2] There are three groups, two dummy variables are entered into the equation The third group is 'English'

[3] Graduate=1, non-graduate=0

4.10.3 Effects of home background on extraversion-introversion behaviour

Table 4.101 shows the results of regression analysis on extraversion-introversion outcome on pre-test, child characteristics and home activities and mother's education. The findings

showed that home activities and parental values explained 7% of the variance in extraversion-introversion outcome (r-sq=0.07, F=2.38, p<0.05).

Table 4.101

Multiple Regression Analysis of Progress in Extraversion-introversion Post-scores on Pre-test, Child Characteristics and Home Background

		R	R-square	Change in r-square	F	P
Step 1	Pre-test, Child characteristics	0.66	0.44	0.44	10.50	<0.01*
Step 2	Home activities & Parental values	0.71	0.50	0.07	2.38	0.05*
Step 3	Mother's education	0.71	0.50	0.00	0.001	0.97

Table 4.102 presents the results of the effects of each explanatory variable on extraversion-introversion post-scores. In examining the frequency of using workbooks at home, the results appeared to indicate a significant negative association with extraversion-introversion (t=-2.17, p<0.05). This meant that higher frequency of mothers working with children at home was related to more introverted behaviour and less extroverted behaviour.

Parents who valued conformity and social behaviour were also found to be significantly associated with extraversion-introversion. However, both of these were negative relationships in which a higher value placed on conformity or social value was associated with less extroverted and more introverted behaviour (t=-2.19, p<0.05 and t=-2.01, p<0.05 respectively).

Table 4.102

Multiple Regression Analysis of Extraversion-introversion Post-scores on Pre-test, Child Characteristics, Home Background

Predictor variable	B	Error of B	T	P
Pre-test	0.65	0.08	7.91	<0.01*
Age	0.01	0.08	0.13	0.90
Gender[1]	0.14	1.05	0.14	0.89
Short form IQ	0.06	0.04	1.28	0.21
Time in care	-0.07	0.05	-1.46	0.15
Home language[2] (English & Chinese)	0.52	1.21	0.43	0.67
Home language[2] (Chinese)	-0.11	1.39	-0.08	0.94
Home reading	0.20	0.24	0.81	0.42
Home workbook	-0.73	0.34	-2.17	0.03*
Parental values				
conformity	-1.30	0.59	-2.19	0.03*
self-direction	-1.13	0.58	-1.92	0.06
social	-1.24	0.61	-2.01	0.05*
Mother's education[3]	0.05	1.36	0.03	0.97
df=13, intercept=53.97, r-sq=0.50, F=6.91, p<0.01				

Note. N (pre-test)=122, N (post-test)=119

[1] Boys=1, girls=0

[2] There are three groups, two dummy variables are entered into the equation The third group is 'English'

[3] Graduate=1, non-graduate=0

4.10.4 Effects of home background on independence-dependence behaviour

Table 4.103 shows a regression analysis conducted on independence-dependence outcome in which pre-test and child characteristics were entered first, followed by home activities and parental values and mother's education last. The findings indicated that pre-test and child characteristics contributed 54% to the variance in the outcome (r-sq=0.54, F=15.38, p<0.01). However, home activities and parental values were not significant explanatory

variables for independence-dependence post-scores (r-sq=0.01, F=0.42, p>0.05). It is also noted that mother's education was also not a significant variable (r-sq=0.003, F=0.63, p>0.05).

Table 4.103

Multiple Regression Analysis of Independence-dependence Post-scores on Pre-test, Child Characteristics and Home Background

		R	R-square	Change in r-square	F	P
Step 1	Pre-test, Child characteristics	0.73	0.54	0.54	15.38	<0.01*
Step 2	Home activities & Parental values	0.74	0.55	0.01	0.42	0.83
Step 3	Mother's education	0.74	0.55	0.003	0.63	0.43

Table 4.104 shows the importance of individual explanatory variables in the regression analysis. The findings indicated that all the variables combined explained 55% of the variable in independence-dependence post-scores (r-sq=0.55, F=8.20, p<0.01). However, after adjusting for pre-test, only one predictor variable, IQ, was established to be significantly associated with independence-dependence post-scores (t=2.08, p<0.05) as in the analysis with home background variables in table 4.69. This was a positive relationship in which higher scores in IQ was associated with higher scores in the outcome.

Table 4.104

Multiple Regression Analysis of Independence-dependence Post-scores on Pre-test, Child Characteristics, Home Background

Predictor variable	B	Error of B	T	P
Pre-test	0.67	0.09	7.63	<0.01*
Age	-0.02	0.08	-0.22	0.83
Gender[1]	0.02	1.05	0.02	0.98
Short form IQ	0.09	0.04	2.08	0.04*
Time in care	0.06	0.04	1.32	0.19
Home language[2] (English & Chinese)	1.34	1.20	1.12	0.27
Home language[2] (Chinese)	1.27	1.38	0.92	0.36
Home reading	-0.02	0.24	-0.09	0.93
Home workbook	-0.30	0.34	-0.89	0.37
Parental values				
conformity	0.10	0.59	0.17	0.87
self-direction	0.19	0.58	0.34	0.74
social	0.04	0.61	0.06	0.95
Mother's education[3]	1.10	1.38	0.80	0.43
df=13, intercept=-11.52, r-sq=0.55, F=8.20, p<0.01				

Note. N (pre-test)=122, N (post-test)=119

[1] Boys=1, girls=0

[2] There are three groups, two dummy variables are entered into the equation The third group is 'English'.

[3] Graduate=1, non-graduate=0

4.10.5 Effects of home background and perceived competence

A regression analysis was conducted in which pre-test and child characteristics are entered first into the equation, followed by home activities and parental values and mother's education last. The findings, as presented in table 4.105, indicated that pre-test and child characteristics explained 21% of the variance in perceived competence (r-sq=0.21, F=3.58. p<0.01). However, home activities and parental values were not significant

predictor variables (r-sq=0.04, F=1.03, p>0.05).

Table 4.105

Multiple Regression Analysis in Perceived Competence Post-scores on Pre-test, Child Characteristics and Home Background

		R	R-square	Change in r-square	F	P
Step 1	Pre-test, Child characteristics	0.46	0.21	0.21	3.58	<0.01*
Step 2	Home activities & Parental values	0.51	0.26	0.04	1.03	0.40
Step 3	Mother's education	0.51	0.26	0.0003	0.04	0.85

Table 4.106 shows the composite of explanatory variables in the regression analysis. The findings indicated that all the variables combined explained 26% of the variance in perceived competence (r-sq=0.26, F=2.30, p<0.01). However, with the exception of pre-test scores, all other variables were not significant predictors of perceived competence.

Table 4.106

Multiple Regression Analysis of Perceived Competence Post-scores on Pre-test, Child Characteristics, Home Background

Predictor variable	B	Error of B	T	P
Pre-test	4.95	1.21	4.07	<0.01*
Age	0.06	0.15	0.43	0.67
Gender[1]	-1.56	1.96	-0.80	0.43
Short form IQ	0.11	0.08	1.30	0.20
Time in care	0.04	0.08	0.45	0.66
Home language[2] (English & Chinese)	-3.73	2.23	-1.67	0.10
Home language[2] (Chinese)	-0.86	2.56	-0.34	0.74
Home reading	-0.46	0.45	-1.02	0.31
Home workbook	1.04	0.65	1.60	0.11
Parental values				
conformity	-1.12	1.10	-1.02	0.31
self-direction	-1.42	1.09	-1.30	0.20
social	-1.64	1.15	-1.43	0.16
Mother's education[3]	-0.47	2.48	-0.19	0.85
df=13, intercept=60.24, r-sq=0.26, F=2.30, p<0.01				

Note. N (pre-test)=122, N (post-test)=119

[1] Boys=1, girls=0

[2] There are three groups, two dummy variables are entered into the equation The third group is 'English'.

[3] Graduate=1, non-graduate=0

4.10.6 Effects on home background on social acceptance

Table 4.107 shows the results of a regression analysis of social acceptance outcome on three sets of explanatory variables. Pre-test and child characteristics were entered first followed by home activities and parental values with mother's education entered last. The findings indicated that pre-test and child characteristics explained 24% of the variance in social acceptance (r-sq=0.24, F=4.27, p<0.01). However, collectively home activities and

parental values, were not significant explanatory variables combined (r-sq=0.06, F=1.58, p>0.05).

Table 4.107

Multiple Regression Analysis (fixed order) of Social Acceptance Post-scores on Pre-test, Child Characteristics and Home Background

		R	R-square	Change in r-square	F	P
Step 1	Pre-test, Child characteristics	0.49	0.24	0.24	4.27	<0.01*
Step 2	Home activities & Parental values	0.55	0.31	0.06	1.58	0.17
Step 3	Mother's education	0.56	0.31	0.003	0.42	0.52

Table 4.108 shows each explanatory variable in this analysis. The findings suggested that one parental value, conformity, was significantly associated with social acceptance (t=-1.92, p<0.05). The negative regression coefficient indicated a relationship in which a higher score in parents valuing conformity was related to a lower score in social acceptance in children.

Table 4.108

Multiple Regression Analysis of Social Acceptance Post-score on Pre-test, Child Characteristics, Home Background

Predictor variable	B	Error of B	T	P
Pre-test	0.40	0.10	4.41	<0.01*
Age	-0.01	0.01	-0.58	0.56
Gender[1]	-0.15	0.19	-0.78	0.44
Short form IQ	-0.01	0.01	-1.21	0.23
Time in care	-0.005	0.01	-0.60	0.55
Home language[2] (English & Chinese)	-0.28	0.21	-1.33	0.19
Home language[2] (Chinese)	-0.22	0.25	-0.89	0.38
Home reading	0.04	0.04	0.90	0.37
Home workbook	-0.004	0.06	-0.07	0.95
Parental values				
conformity	-0.20	0.11	-1.92	0.05*
self-direction	-0.16	0.10	-1.50	0.14
social	-0.17	0.11	-1.58	0.12
Mother's education[3]	0.15	0.24	0.65	0.52
df=13, intercept=13.45, r-sq=0.31, F=2.99, p<0.01				

Note. N (pre-test)=122, N (post-test)=119

[1] Boys=1, girls=0

[2] There are three groups, two dummy variables are entered into the equation The third group is 'English'.

[3] Graduate=1, non-graduate=0

4.10.7 Summary of the effects of home background on social-emotional behaviours

The social-emotional outcomes, considerateness, extraversion and perceived social acceptance were significantly predicted by home background variables. There appeared to be a suggestion that creativity/curiosity was also predicted by home background variables but this association was of borderline significance only. A summary of these findings are found in table 4.109.

The findings indicated that the parental social value significantly affected considerate behaviour in children. With reference to table 4.109, this effect was large (see footnote 1) and showed that with every one unit increase in parents value of pro-social skills, considerateness increased by 1.35 in raw score (b-value). This was expected as a home environment that encouraged social interaction is likely to promote cooperation and considerateness in children.

Extravert behaviour appeared to be significantly predicted by frequency of doing home work and parental values of conformity and social skills. The relationship with homework was negative (b=-0.73) which meant that with every one unit increase in the frequency of doing home work, extraversion outcome decreased by 0.73 in raw score. This effect was moderate (see footnote 1). It is possible that children who spent more time in completing structured tasks using the workbooks, also spent more time on their own and less time playing socially with other children or adults in the home environment. This may not enhance social interest and confidence.

Two parental values, conformity and social value, had large and negative effects on extravert behaviour. Of the two, conformity had a stronger effect (ES=-0.75) than parental social value (ES=-0.48). The negative relationships meant that with every one unit increase in parents value in conformity, extraversion decreased by 1.30 in raw score (B-value). This indicated that children who came from a home environment that required more obedience and compliance were children who were less extraverted. A similar result for social value was established. However, it is surprising that parental social value was a significant negative predictor of extravert behaviour. It may be that extraversion

required confidence and ability to initiate in social situations whereas parents interpreted sociability to mean kindness, considerateness and cooperativeness and these qualities do not require much social independence. Therefore, a home environment that emphasised social values did not necessarily enhance extravert behaviour.

Perceived social acceptance was negatively predicted by parental value in conformity. The magnitude of this effect was large and indicated that the more parents valued conformity in their children, the less the children felt socially accepted (b-value=-0.20). A possible explanation for this relationship was that a home environment that emphasised obedience and compliance gave children the underlying message that they may not conform enough. Therefore, they may feel less confident and independent in social situations and may not feel socially accepted.

It is also interesting to note that although the effects only approached statistical significance, frequency of reading at home and doing home work appeared to be associated with higher scores in creative/curious behaviour. The positive and moderate effect (ES=0.19) of the frequency of reading at home indicated that a reading environment created by parents can have a beneficial effect on children's creative skills. In contrast, the negative and moderate effect (ES=-0.18) of frequency of doing home work indicated that the more home work was done the less evidence of creative/curious behaviour. This may mean that home work might have restricted independent thinking and discovery as the nature of home work using workbooks was structured and required conformity.

Table 4.109

The Effects of Home Background on Social-emotional Outcomes

		Social-emotional Outcomes					
Predictor Variables		Consider-ateness	Creativity/ curiosity	Extra-version	Indepen-dence	Perceived competence	Social acceptance
Home reading	B	n.s.	0.54+	n.s.	n.s.	n.s.	n.s.
	Effect size		0.19+				
Home work	B	n.s.	-0.74+	-0.73*	n.s.	n.s.	n.s.
	Effect size		-0.18+	-0.19*			
Conform-ity value	B	n.s.	n.s.	-1.30*	n.s.	n.s.	-0.20*
	Effect size			-0.75*			-0.78*
Social value	B	1.35*	n.s.	-1.23*	n.s.	n.s.	n.s.
	Effect size	0.43*		-0.48*			
Self-direction value	B	n.s.	n.s.	-1.13+	n.s.	n.s.	n.s.
	Effect size			-0.77+			

[1] beta weights
+ $p<0.10$ * $p<0.05$

Part Three

4.11 Re-examination of entre 'quality' in relation to home background variables

As findings from the above analyses indicated that home background was associated significantly with some child outcomes, a re-analysis of centre 'quality' effects was conducted to take these variables into account. Results indicated that the language outcome, verbal comprehension, was significantly influenced by parental values. However, as centre effect was not establish (refer to section 4.3.3.2), re-analysis was not conducted on this outcome. For social-emotional outcomes, results indicated that considerateness, extraversion and social acceptance were significantly influenced by the home background (refer to table 4.109). However, social acceptance outcome was not re-examined because centre effect was not obtained also (refer to section 4.4.6.2). The social-emotional outcomes, considerateness and extraversion, were significantly influenced by day care 'quality' and home background in separate analyses. Therefore, a re-analysis of these outcomes were conducted with the influence of both predictor variables taken in account.

4.11.1 Re-analysis of considerateness-hostility post-scores

As established in section 4.4.1.3, centre 'quality' was a significant predictor of considerateness-hostility post-scores. It was also found, in section 4.10.1, that parents who valued social skills had a significant influence on this outcome. A re-analysis of this child outcome was conducted and the results presented in table 4.110. The findings indicated that parental social value marginally partialled out the effect of centre 'quality' (b-value changed from 2.60 to 2.15, see tables 4.34 and 4.110 respectively) on children's progress in considerate behaviour ($t=1.68$, $p=0.10$). Social value remained a more

significant predictor (t=2.68, p<0.01).

Table 4.110

Multiple Regression Analysis of Considerateness-hostility Post-scores on Pre-test , Child Characteristics, Home Background and Centre 'Quality'

Predictor variable	B	Error of B	T	P
Pre-test	0.61	0.07	8.48	<0.01*
Age	0.11	0.09	1.31	0.19
Gender[1]	-2.97	1.08	-2.75	0.01*
Short form IQ	0.05	0.05	1.12	0.27
Time in care	0.03	0.05	0.52	0.60
Home language (English & Chinese)[2]	3.10	1.24	2.51	0.01*
Home language (Chinese)[2]	1.09	1.42	0.77	0.44
Mother's education[3]	1.41	1.37	1.03	0.30
Parental value social	0.59	0.22	2.68	0.01*
Centre 'Quality'	2.15	1.28	1.68	0.10
df=10, intercept=-22.18, r-sq=0.59, F=13.39, p<0.01				

Note. N (pre-test)=122, N (post-test)=119
[1] Boys=1, girls=0
[2] Consists of three groups, two created as dummy variables, the third is 'English'.
[3] Graduate=1, non-graduate=0

The ECERS subscale, *social development*, was previously found to be also a significant predictor of considerate behaviour (see section 4.4.2.5). The results presented in table 4.111 shows the results of a re-examination of the effect of this variable after taking parental social value into account. The findings suggested that *social development* was still a significant predictor of considerateness (b-value changed from 2.08 to 1.85, see tables 4.36 and 4.111). The change in r-square indicated that the 'quality' subscale explained 2% (r-sq=0.02, t=2.07, p<0.05) of the variance in the outcome after the

influence of parental social value has been taken into account. It is also noted that parental social value maintains its significant influence (t=3.12, p<0.01) on considerateness-hostility behaviour.

Table 4.111

Concise Model of Multiple Regression Analysis of Considerateness-hostility Post-scores on Pre-test, Child Characteristics, Home Background and Social Development 'Quality' Subscale

Predictor variable	B	Error of B	T	P
Pre-test	0.62	0.07	9.02	<0.01*
Gender[1]	-2.33	1.00	-2.32	0.02*
Home language (English & Chinese)[2]	2.40	1.13	2.13	0.04*
Home language (Chinese)[2]	-0.04	1.33	-0.03	0.98
Parental value social	0.61	0.19	3.12	<0.01*
Social development	1.85	0.89	2.07	0.04*
df=6, intercept=-6.73, r-sq=0.56, F=23.38, p<0.01				

Note. N (pre-test)=122, N (post-test)=119
[1] Boys=1, girls=0
[2] Consists of three groups, two created as dummy variables, the third is 'English'.

The subscale, *fine and gross motor activities*, was previously found to be a significant predictor of children's considerate behaviour (see section 4.4.2.5). Table 4.112 presents the re-examination of the effect of this subscale 'quality' with parental social value taken into account. The findings showed that *fine and gross motor activities* remained a significant predictor and explained 2% of the variance in considerateness (r-sq=0.02, t=2.46, p<0.05). The regression coefficient changed from 2.71 to 2.46, see tables 3.37 and 4.112. It is also noted that parental social value predicted the outcome significantly (t=3.13, p<0.01).

Table 4.112

Concise Model of Multiple Regression Analysis of Considerateness-hostility Post-scores on Pre-test, Child Characteristics, Home Background and Fine and Gross Motor Activities 'Quality' Subscale

Predictor variable	B	Error of B	T	P
Pre-test	0.67	0.07	10.31	<0.01*
Gender[1]	-2.17	1.00	-2.17	0.03*
Home language (English & Chinese)[2]	2.76	1.13	2.44	0.02*
Home language (Chinese)[2]	0.32	1.34	0.24	0.81
Parental value social	0.61	0.19	3.13	<0.01*
Fine and Gross Motor	2.46	1.00	2.46	0.02*
df=6, intercept=-11.74, r-sq=0.57, F=24.02, p<0.01				

Note. N (pre-test)=122, N (post-test)=119

[1] Boys=1, girls=0

[2] Consists of three groups, two created as dummy variables, the third is 'English'.

A re-analysis of the ECERS subscale, *personal care and routines*, was also conducted with parental social value taken into account. Table 4.113 presents the findings and shows that this subscale 'quality' remained a significant predictor of considerateness-hostility post-scores also. *Personal care and routines* explained 3% of the variance in this outcome after taking parental social value into account (r-sq=0.03, t=2.77, p<0.01). The regression coefficient changed from 2.88 to 2.50 (see tables 4.35 and 4.113). Parental social value remained a significant predictor (t=2.77, p<0.01).

Table 4.113

Concise Model of Multiple Regression Analysis of Considerateness-hostility Post-scores on Pre-test, Child Characteristics, Home Background and Personal Care and Routines 'Quality' Subscale

Predictor variable	B	Error of B	T	P
Pre-test	0.65	0.06	10.12	<0.01*
Gender[1]	-2.42	0.99	-2.44	0.02*
Home language (English & Chinese)[2]	2.16	0.06	1.94	0.06
Home language (Chinese)[2]	-0.23	1.30	-0.18	0.86
Parental value social	0.54	0.19	2.77	0.01*
Personal and care routines	2.50	0.90	2.77	0.01*
df=6, intercept=-9.71, r-sq=0.58, F=24.62, p<0.01				

Note. N (pre-test)=122, N (post-test)=119

[1] Boys=1, girls=0

[2] Consists of three groups, two created as dummy variables, the third is 'English'.

4.11.2 Re-analysis of extraversion-introversion post-scores

As established in section 4.10.3, the frequency of doing home work and parental values in conformity and social behaviour significantly influenced extraversion progress. A re-analysis of the effect of the one ECERS subscale found to be a significant predictor in section 4.4.3.5, was conducted with home background taken into account. Table 4.114 shows the results of this re-analysis. The findings indicated that with the effects of home background variables marginally partialled out the effect of *fine and gross motor activities* on extraversion progress (the b-value changed from 2.33 to 1.77, see tables 4.60 and 4.114). The subscale approached significance in its effects (t=1.94, p=0.06). The frequency of children working at home with their mothers appeared to be the stronger predictor (t=-2.16, p<0.05). This was a significant negative relationship in which higher frequency of doing homework was related to lower scores in extraversion.

Table 4.114

Concise Model of Multiple Regression Analysis of Extraversion-introversion Post-scores on Home Background and Fine and Gross Motor Activities

Predictor variable	B	Error of B	T	P
Pre-test	0.67	0.07	9.80	<0.01*
Home workbook	-0.58	0.27	-2.16	0.03*
Parental values				
conformity	-0.15	0.12	-1.23	0.22
social	-0.07	0.18	-0.40	0.69
Fine and Gross Motor Activities	1.77	0.92	1.94	0.06
df=5 , intercept=1.28, r-sq=0.51, F=22.54, p<0.01				

Note. N (pre-test)=122, N (post-test)=119

4.11.3 Summary of the re-analysis of the effects of centre 'quality'

In general, the effects of home background, as shown in tables 4.96 and 4.109, were significant only for verbal comprehension, considerateness, extraversion and perceived social acceptance. As centre effect was not obtained for verbal comprehension and perceived social acceptance a re-examination of the effects of day care 'quality' was not necessary. So it appeared that the home was more influential in enhancing verbal comprehension and social acceptance.

With reference to table 4.115, a re-analysis of the effects of day care 'quality' with home background taken into account showed that although the effects of day care 'quality' was reduced in its magnitude, most of them remained significant. For considerateness behaviour, the effect of total centre 'quality' was reduced and became non-significant, but

the subscales, *fine and gross motor activities*, *social development* and *personal care* remained significant.

This was also similar for the effect of the 'quality' of *fine and gross motor activities* on extraversion post-scores. Although reduced in its magnitude, the predictor remained significant in its influence in enhancing extravert behaviour.

Table 4.115

The Effects of Day Care 'Quality' on Child Outcomes Before and After Home Background is taken into Account[2]

		Social-emotional Outcomes			
		Considerateness		Extraversion	
ECERS		Unadjusted[2]	Adjusted	Unadjusted	Adjusted
Centre 'Quality'	B	2.60*	2.15+	-	-
	Effect size[1]	0.15*	0.12+		
Fine & Gross	B	2.71*	2.46*	2.33*	1.77*
	Effect size	0.17*	0.16*	0.17*	0.13*
Social Develop	B	2.08*	1.85*	-	-
	Effect size	0.16*	0.14*		
Personal & Care	B	2.88**	2.50**	-	-
	Effect size	0.20**	0.18**		

* $p<0.05$ ** $p<0.01$ + $p<0.10$

[1] beta weights

[2] Results of analysis before (unadjusted) and after (adjusted) taking account of home background variables.

2

Results in tables 4.96 and 4.109 showed that home background was not significantly associated with verbal fluency, word reading, creativity/curiosity and independence. Therefore, a re-analysis was not conducted. Although home background was associated with verbal comprehension significantly, this outcome was omitted in the re-analysis as centre effect was not established as shown in table 4.29.

CHAPTER FIVE: RESULTS II (CHILD OBSERVATIONS)

5.1 Introduction

It was the aim of this research to investigate the characteristics of the day care environment and their impact on children's development. The previous chapter explored the 'quality' of day care centres as a feature of the day care environment. This chapter presents the results of observations of child behaviours in the day care centres and specifically, to explore the typical activities children are involved in and their social interactions that may be associated with their progress. The Target Child method of observation was used and a total of 12,800 thirty-second intervals of behaviour was recorded. These behaviours were analysed according to two behavioural codes (refer to appendix H for coding details). They were:

(i) Task involvement codes that consisted of 24 activity categories.

(ii) Social group codes that consisted of four categories out of which verbal interaction was also recorded.

The plan of data analysis was constrained by two limitations. The first was the small sample size of 16 centres. The second was that due to the economy of this project, each child was observed for 40 minutes (two 20-minute observations). This represents both a relatively short total duration and a paucity of occasions compared to Tizard, Philips and Plewis' study (1976a & b) which observed each child during ten 10-minute sessions of play in pre-schools. Tizard et al's sample was considered more representative of the variable investigated. Therefore, analyses for this part of the research were descriptive

and exploratory, and findings were used to generate hypotheses for future research in Singapore pre-schools.

The findings in this chapter are presented in two parts, according to the above behavioural codes. For each code, a general description using frequencies and percentages are presented to give an overall picture of the type of tasks in which children were engaged and the types of social interaction found in Singapore day care centres.

This description is followed by an exploratory analysis of the differences in type of task involvement and social interaction between high progress centres and low progress centres. Centres were classified as high or low progress for each child outcome according to whether the score for the centre was above or below the median, after adjusting for child characteristics and home background. A comparison of the differences in means was analysed by the t-test for independent samples as the distribution of means were taken to be normally distributed (Central Limit theorem).

Data analyses were conducted for all the language and social-emotional outcomes. However, results reported in this chapter include the language outcomes only as significant results were not obtained from the analyses conducted on social-emotional outcomes.

5.2 Task involvement observed in the day care centres

5.2.1 Description of task activities

A total of 160 children from 16 day care centres were observed for 20 minutes twice.

Table 5.1 shows the results of the frequencies and proportions of the different tasks children were involved in. For example, periods of observation when children were observed to be in a whole group, usually seated on the mat and listening to the teacher, were coded passive adult led group activities (PALGA). These activities included the child listening to a story, singing and/or saying rhymes in unison, listening to the teacher give instructions for reading, writing, number work or any project work. Although it has been observed that the teacher directed in these situations, children were encouraged, at times, to contribute and respond when given the chance. From table 5.1, it appeared that PALGA were observed to occur the most frequently (27.4%).

"Three R's" activities occurred the second most frequently. These included actual reading, writing and number work when children were at their tables working on a worksheet or workbook or reading a book. "Domestic activities" and "waiting" accounted for 12.5% and 10% of the observed time respectively. More than half of the observed time (68.2%) was taken up by these four categories of activity in the Singapore day care centres sampled.

Table 5.1

Frequencies and Percentages of Task Activities Observed

Task Activity	N	Percent of Total Time
Passive adult led group activities	3503	27.4
Three Rs activities	2340	18.3
Domestic activities	1599	12.5
Waiting	1276	10.0
Purposeful movement	652	5.1
Adult directed art & manipulation	535	4.2
Manipulation	345	2.7
Large muscle movement	342	2.7
Watching	334	2.6
Art	312	2.4
Small scale construction	280	2.2
Pretend	279	2.2
Games with rules	253	2.0
Cruising	173	1.4
Music	126	1.0
Social interaction non-play	109	0.9
Large scale construction	100	0.8
Scale version toys	97	0.8
Discipline	32	0.3
Informal games	24	0.2
Structured materials	23	0.2
Examination	19	0.1
Rough & tumble	15	0.1
Role play	10	0.1
Disturbing behaviour	9	0.1
Decision making	7	0.1
Attention seeking	6	0.0
Total	12800	100

Similar task activities were combined into groups in order to obtain broader analyses of the effects of these activities on child development outcomes. The combinations were as follows:

Creative activities:

These activities consisted of large scale construction, small scale construction, scale version toys, art, music and pretend play. These were more open-ended activities that required the children to be independent, imaginative and to show initiative.

Cognitive activities:

These consisted of academic three Rs, that are reading, writing and number work. Decision-making and examination, which occurred rarely (0.1%), were added into this category as they were observed in the academic context. The three Rs activities took up 18.3% of the observed time in relation to other activities. These were observed to involve more structured individual desk work and required concentration.

Whole Group activities:

These consisted of passive adult led group activities as described in the above.

Fine and Gross Motor activities:

These activities involved physical skills and consisted of large muscle movement, games with rules, adult directed art and manipulation and manipulative activities. Games with rules were observed to be part of an outdoor physical education session in the day care programme often led by the teacher.

Social Interaction:

These were activities that involved spontaneous conversations and informal games.

Daily Routine:

This group of activities consisted of domestic activities and purposeful movement. They were part of the day-to-day routine which involved meals, bathing, and movement from one area to another for a planned activity for the day.

Non- participation:

These were observed behaviours that consisted of waiting, watching, cruising, and attention-seeking. They represented behaviours that were non-participating and transitional.

Disturbance:

These behaviours involved some form of disruption in the daily programme and required teachers to intervene in order to re-establish some degree of control. These behaviours were rough and tumble, crying, disciplinary action (e.g. standing in a corner) and disturbing behaviour.

Table 5.2 shows the percentages of each type of combined task activities observed. Adult-led whole group activities were observed to take up 27.37% of the time observed. This was followed by cognitive activities (18.48%), daily routine (17.59%), non-participation (13.98%), fine and gross motor activities (11.70%) and creative activities (9.41%). Social interaction and disturbance occurred the least (1.04% and 0.44%)

respectively. Figure 5.1 illustrates a general picture of the type of task involvement that were observed. Refer to appendix N for raw frequencies across the 16 centres.

Table 5.2

Frequencies and Percentages of Task Activity Groups Observed

Task Activity	N (16 centres)	Min	2nd Quartile	3rd Quartile	Max	Percent of Total Time
Whole group	3503	107	147.25	286.75	360	27.37
Cognitive activities	2366	87	108.5	205.5	235	18.48
Daily routine	2251	97	116.25	149.50	214	17.59
Non participation	1789	55	81.25	151.50	185	13.98
Fine & gross	1498	0	42.25	120	246	11.70
Creative activities	1204	0	44.75	107	129	9.41
Social interaction	133	0	1.25	14	28	1.04
Disturbance	56	0	0	2.75	18	0.44
Total	12800					100

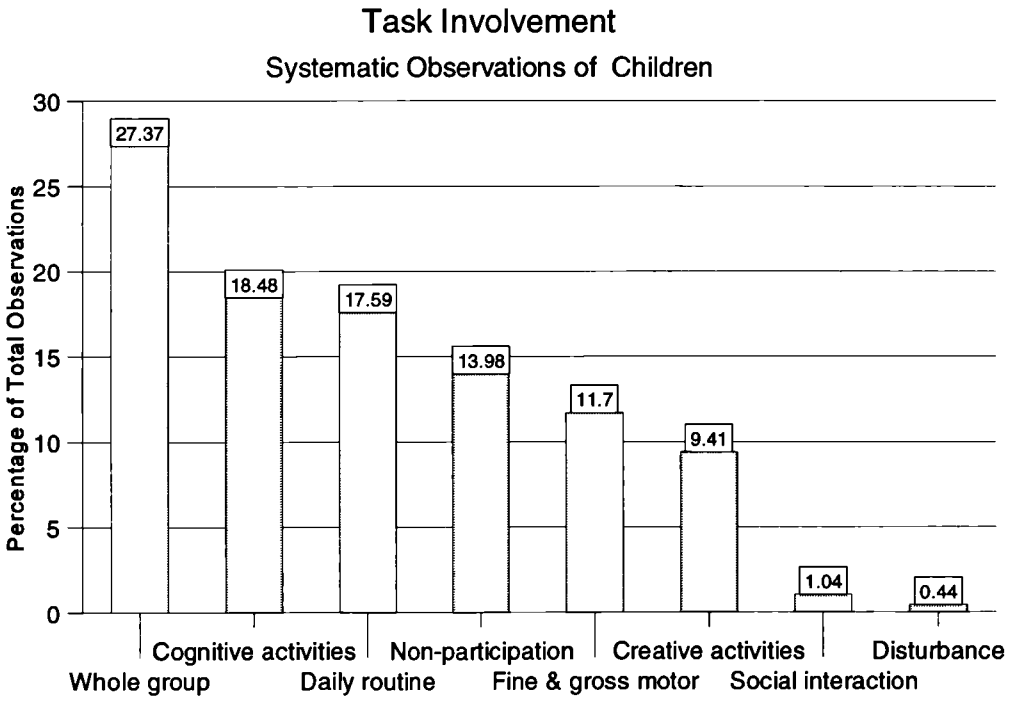


Figure 5.1. Percentage of type of task involvement observed

5.2.2. Relationship between task activities

A correlation analysis between these groups was conducted and table 5.3 presents the findings. The results indicated that all except two subgroups (social interaction and non-participation) were either not significantly correlated or have significant negative relationships with each other. The negative correlations appeared to indicate that more occurrence of one group of activities is associated with less occurrence of the other. This is not surprising because if children were involved more frequently in one task, it is less likely that they were involved in another.

However, the two task groups, non-participation and social interaction, were found to be positively related. This may indicate that social interaction between children was more likely to be observed in non-participating tasks like waiting, watching, cruising and standing around. While they were in a transitional mode, spontaneous social conversations and interactions occurred more frequently.

Table 5.3

Correlation Analysis of Task Involvement Subgroups

	Cognitive activities	Creative activities	Daily routine	Fine & Gross	Whole group	Non-partici-pation	Social interact-ion	Disturb-ance
Cognitive activities		-0.26**	-0.17*	-0.28**	-0.23**	-0.18*	0.11	-0.18
Creative activities			-0.23**	-0.10	-0.12	-0.03	-0.03	-0.06
Daily routine				-0.03	-0.42**	-0.16	-0.09	-0.09
Fine & gross					-0.35**	-0.20*	-0.07	-0.10
Whole group						-0.26**	-0.17	0.10
Non-participation							0.33**	0.08
Social interaction								0.15

* $p<0.05$ ** $p<0.01$
N=122

5.3 Social interaction observed in the day care centres

5.3.1 Description of social groups

Each child observation was classified into one of four social group codes. Children can be (a) alone, (b) in a pair, (c) in a small group which consisted of not more than five children or (d) in a large group of more than five children together. Table 5.4 describes the frequencies and percentages of social groupings that occurred during the observation. Most of the time (68.48%) children were observed to be in large groups. The second most frequent category was "small groups" consisting of 21.31% of the time. Children observed in pairs (5.85%) and alone (4.36%) were the least frequently observed

groupings. Refer to appendix O for raw frequencies across all the day care centres.

Table 5.4

Frequencies and Percentages of Social Grouping Observed

Social grouping	N	Percent of Total Time
Large group	8765	68.48
Small group	2728	21.31
Pair	749	5.85
Alone	558	4.36
Total	12800	100

5.3.2 Verbal interaction with social groups

Observations were also coded in relation to the frequency of verbal interaction that occurred within the social groupings. This meant that children who were observed to be together, either in pairs, large groups or small groups, and who were not verbally interacting were coded 'no talk'. On the other hand, if the children were observed in verbal interaction within the social groups, the behaviour was coded 'talk'. Table 5.5 shows the proportion of 'talk' and 'no talk' within each social group.

Table 5.5

Frequencies and Percentages of Social Grouping Observed

	Talk		No talk		
Social grouping	N	Percent of Total Time	N	Percent of Total Time	Total N
Large group	3406	38.86%	5359	61.14%	8765
Small group	1308	47.95%	1420	52.05%	2728
Pair	472	63.02%	277	36.98%	749
Alone	-	-	-	-	-
Total	5186	42.36%	7057	57.64%	12242

The findings from table 5.5 suggests that children who were not alone spent more time not talking (57.64%) than talking (42.36%). However, this was not a big difference. On examining the occurrence of talk within the social groups, it appeared that talking was more likely to occur when children were in pairs (63.02%). In large group and small group situation, talking was less likely to occur. For example, 61.14% of the time spent in large groups was not talking compared to 38.86% talking. The results suggested that occurrence of verbal interaction decreased as social group size increased. Figure 5.2 illustrates the results.

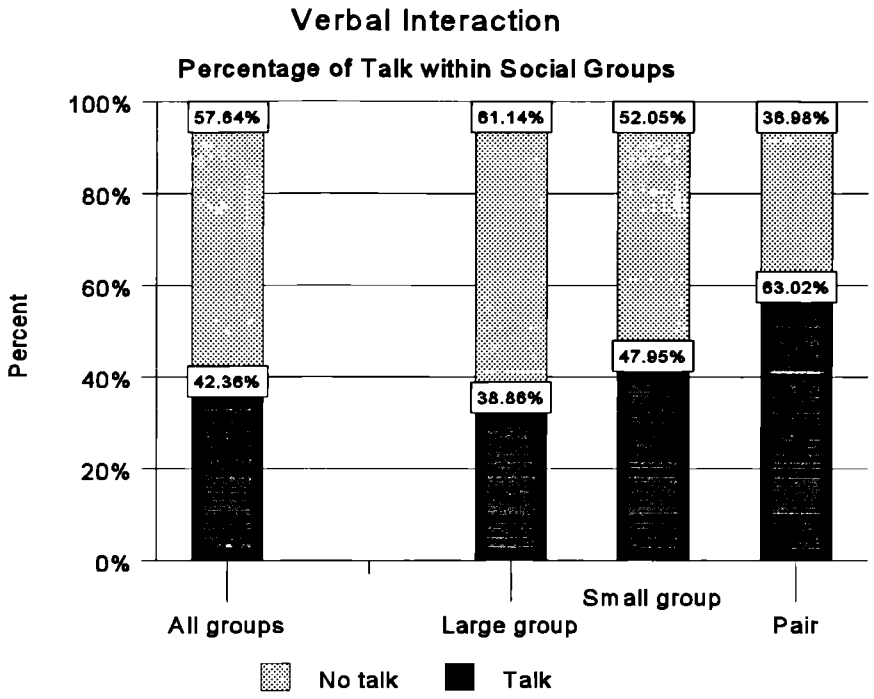


Figure 5.2. Bar chart of verbal interaction with social groups

5.4. Differences in child behaviour between verbal comprehension progress groups

5.4.1 Comparison of task activities between verbal comprehension progress groups

Figure 5.3 shows that for centres in which progress in verbal comprehension was better than average, children were observed to be occupied by cognitive, non participatory and social interactive activities more than children in low progress centres. There were some instances of disturbing behaviour also, compared to none in lower progress centres.

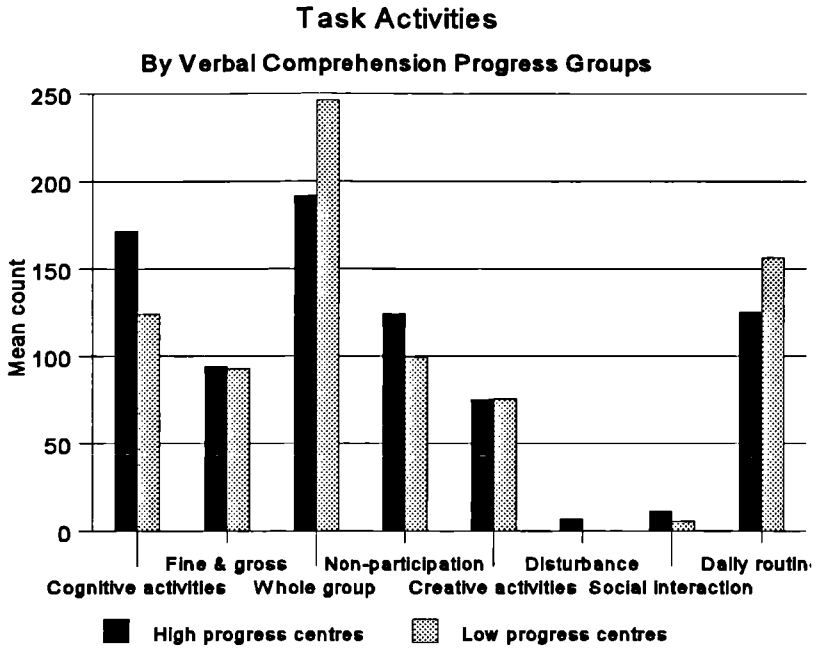


Figure 5.3. Bar chart of task activities for verbal comprehension progress groups

With reference to table 5.6, results suggested that centres with higher progress in verbal comprehension had significantly more cognitive activities (mean=171.63) than centres with lower progress (mean=124.13). On the other hand, centres with lower progress had significantly higher occurrence of daily routine (mean=156.25) than high progress centres (m=123.13). Whole group activity occurred more in low progress centres than high progress centres and the difference approached statistical significance. It is also noted that differences in disturbance incidents approached statistical significance. However, total occurrence of this behaviour was rare (9 occurrences out of 12800 observations) and therefore it is difficult to interpret this finding. The general finding suggested that progress in verbal comprehension may be enhanced by cognitive activities and implied that

more occurrence of daily routine may not develop verbal comprehension skills. However, it could be that daily routine merely limited the time available for cognitive activities rather than actively hindering progress.

Table 5.6

Comparison of Type of Talk Activities by Verbal Comprehension Progress Groups

	High Progress (N=8)		Low Progress (N=8)		
Task Activities	Mean	S.D.	Mean	S.D.	P
Cognitive activities	171.63	54.48	124.13	38.50	0.07
Fine & Gross	94.38	52.22	92.88	73.75	0.96
Whole group activity	191.75	75.81	246.13	66.75	0.15
Non-participation	124.25	49.78	99.38	38.88	0.23
Creative activities	75.00	43.73	75.50	30.82	0.98
Disturbance	6.75	8.60	0.25	0.71	0.07
Social	11.12	10.59	5.5	5.45	0.21
Daily routine	125.13	18.08	156.25	34.96	0.05*

Note. 800 30-second intervals observed for each progress group

5.4.2 Comparison of social groups between verbal comprehension progress groups

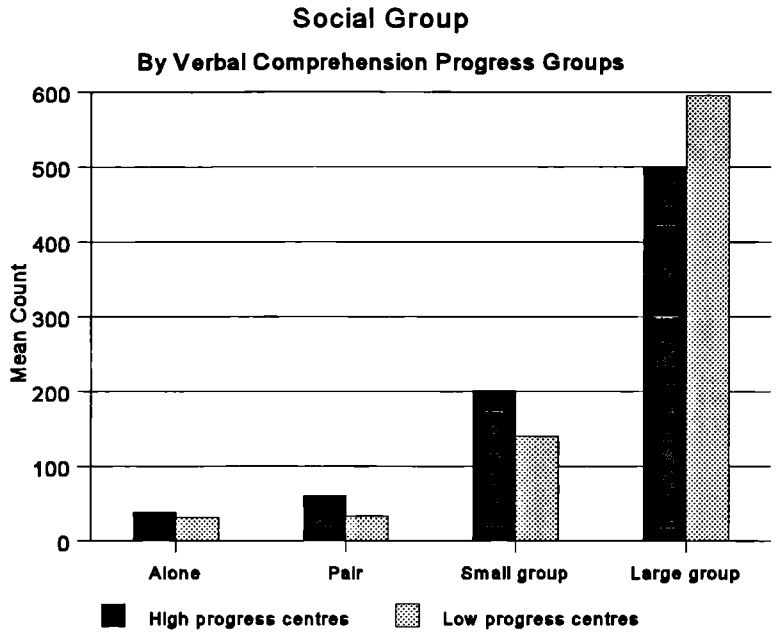


Figure 5.4. Bar chart of social group by verbal comprehension progress groups

Figure 5.4 shows that children in centres with higher progress in verbal comprehension were more likely to be alone, in pairs or in a small group compared with children in centres which made lower than average progress. Table 5.7 shows that significantly more children were found in pairs in high progress centres (mean=60.63) for verbal comprehension than low progress centres (mean=33.00). Also, children from higher progress centres were observed more frequently in small groups (mean=200.88) than children from lower progress centres (mean=140.13). The difference in frequencies was substantial but because the sample size was small, statistical significance was only

borderline. Conversely, large groups were found to occur more often in centres (mean=595.50) which made low progress in verbal comprehension outcome than in high progress centres (mean=500.13). This difference approached significance (p=0.06).

Table 5.7

Comparison of Type of Social Grouping by Verbal Comprehension Progress Groups

	High Progress (N=8)		Low Progress (N=8)		
Social Grouping	Mean	S.D.	Mean	S.D.	P
Alone	38.38	14.73	31.38	16.94	0.49
Pair	60.63	33.93	33.00	31.56	0.06
Small group	200.88	60.78	140.13	77.77	0.10
Large group	500.13	83.69	595.50	101.26	0.06

Note. 800 30-second intervals observed for each progress group

A further examination on the proportion of talk that occurred within each social grouping showed no significant difference between the two progress groups (refer to table 5.8).

Table 5.8

Comparison of Proportion of Talk within Social Grouping by Verbal Comprehension Progress Groups

	High Progress(N=8)		Low Progress(N=8)		
Social Grouping	Mean	S.D.	Mean	S.D.	P
Pair	0.67	0.19	0.62	0.19	0.58
Small group	0.46	0.13	0.52	0.12	0.40
Large group	0.40	0.09	0.37	0.07	0.46
Total	0.44	0.10	0.41	0.05	0.50

Note. 800 30-second intervals observed for each progress group

5.5 Differences in child behaviour between verbal fluency progress groups

5.5.1 Comparison of task activities between verbal fluency progress groups

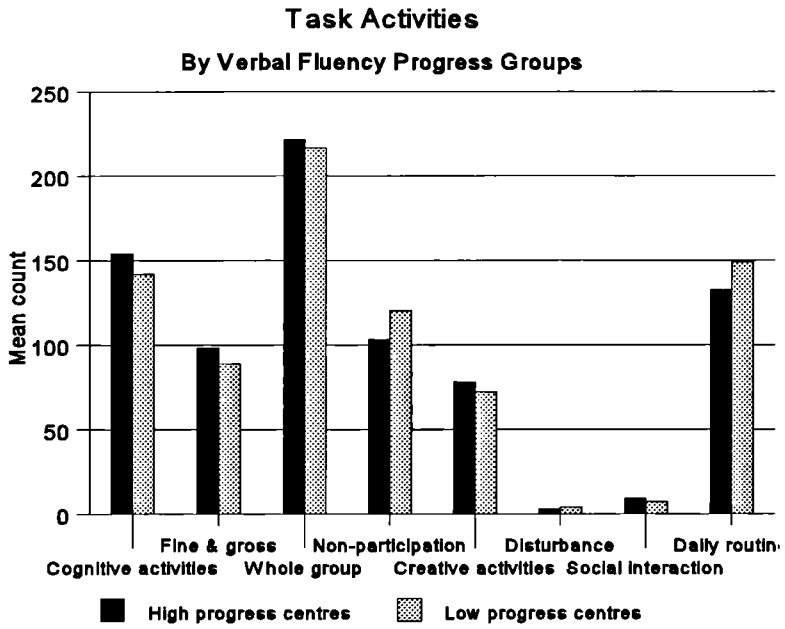


Figure 5.5. Bar chart of task activities by verbal fluency progress groups

Figure 5.5 shows that there were more occurrences of cognitive, fine and gross, adult-led whole group and creative activities in centres that made higher progress in verbal fluency than low progress centres. Children from low progress centres were observed more frequently in non-participatory and daily routine activities. However, table 5.9 indicates that these differences were not statistically different.

Table 5.9

Comparison of Type of Child Activities by Verbal Fluency Progress Groups

	High Progress (N=8)		Low Progress (N=8)		
Child Activities	Mean	S.D.	Mean	S.D.	P
Cognitive activities	154.00	59.39	141.75	46.12	0.65
Fine & Gross	98.38	46.86	88.88	76.94	0.77
Whole group	221.38	57.03	216.50	92.88	0.90
Non-participation	103.25	36.82	120.38	44.78	0.42
Creative activities	78.25	27.91	72.25	45.42	0.76
Disturbance	2.88	6.22	4.13	7.68	0.73
Social	9.38	8.98	7.25	8.76	0.64
Daily routine	132.50	33.87	148.88	28.33	0.31

Note. 800 30-second intervals observed for each progress group.

5.5.2 Comparison of social groups between verbal fluency progress groups

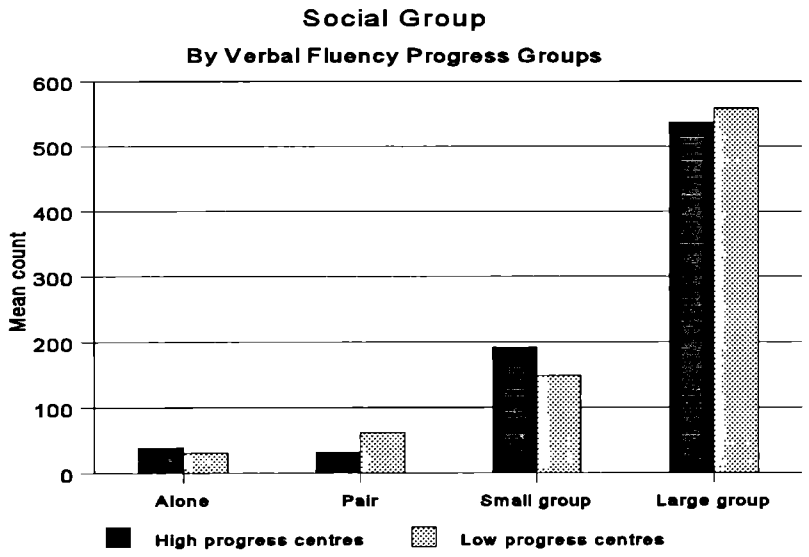


Figure 5.6. Bar chart of social grouping by verbal fluency progress groups

In general, most children were found in large groups for both verbal fluency progress groups However, figure 5.6 shows that more children from high progress centres were found either alone or in small groups compared to centres that made low progress in verbal fluency. Children in low progress centres were observed to be in pairs and large groups more. Table 5.10 shows that these differences were not significantly different.

Table 5.10

Comparison of Type of Social Grouping by Verbal Fluency Progress Group

	High Progress (N=8)		Low Progress (N=8)		
Social Grouping	Mean	S.D.	Mean	S.D.	P
Alone	39.00	14.77	30.75	16.58	0.31
Pair	32.13	19.07	61.50	41.56	0.17
Small group	192.13	78.43	148.88	68.05	0.26
Large group	536.75	93.58	558.88	115.84	0.68

Note. 800 30-second intervals observed for each progress group

Table 5.11 shows that there were only small and non-significant differences in the proportion of time spent talking in pairs and large groups as function of group size between high and low progress centres.

Table 5.11

Comparison of the Proportion of Verbal Interaction within Social Grouping by Verbal Fluency Progress Groups

	High Progress (N=8)		Low Progress (N=8)		
Social Grouping	Mean	S.D.	Mean	S.D.	P
Pair	0.66	0.24	0.63	0.13	0.75
Small group	0.49	0.09	0.49	0.16	0.97
Large group	0.41	0.06	0.37	0.09	0.34
Total	0.44	0.05	0.41	0.10	0.51

Note. 800 30-second intervals observed for each progress group

5.6 Differences in child behaviour between word reading progress groups

5.6.1 Comparison of task activities between word reading progress groups

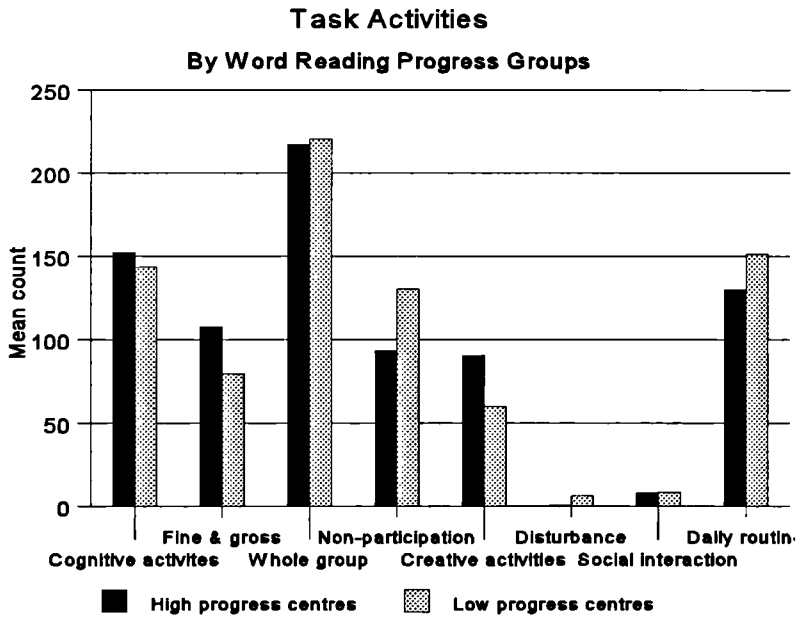


Figure 5.7. Bar chart of task activities by word reading progress groups

Figure 5.7 shows that more cognitive, fine/gross and creative activities were observed in centres that made higher progress in word reading than low progress centres. There were more occurrences of whole group, non-participatory and daily routine activities among the low progress centres. Table 5.12 shows that the difference in frequency of non-participatory activities was statistically significant with more such observations in low progress centres (mean=130.25) than high progress centres (mean=93.38). This was also the case with occurrences of daily routine, in which children from centres that made lower progress in word reading were more likely to be occupied with daily routine activities (mean=151.38) than children from higher progress centres (mean=130.00).

Table 5.12

Comparison of Type of Child Activities by Word Reading Progress Groups

	High Progress (N=8)		Low Progress (N=8)		
Child Activities	Mean	S.D.	Mean	S.D.	P
Cognitive activities	152.25	56.95	143.50	49.52	0.75
Fine & Gross	107.75	38.71	79.50	78.83	0.38
Whole group	217.25	62.09	220.63	89.62	0.93
Non-participation	93.38	29.63	130.25	43.29	0.07
Creative activities	90.50	25.62	60.00	40.92	0.10
Disturbance	0.63	1.19	6.38	8.85	0.09
Social	8.25	8.58	8.38	9.29	0.98
Daily routine	130.00	33.97	151.38	26.22	0.07

Note. 800 30-second intervals observed for each progress group

5.6.2 Comparison of social groups between word reading progress groups

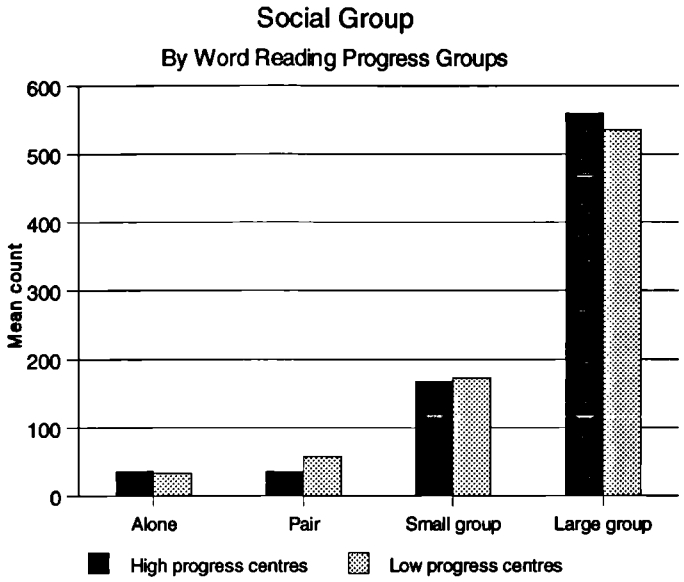


Figure 5.8. Bar chart of social groupings by word reading progress groups

With reference to figure 5.8, it appeared that children were more likely to be in large groups in centres that made higher progress in word reading than centres that made lower progress. The opposite was true for the other social groupings. Children from lower progress centres were more likely to be in pairs or in small groups compared with the higher progress centres. However, table 5.13 shows that these differences were not significant.

Table 5.13

Comparison of Type of Social Grouping by Word Reading Progress Group

	High Progress (N=8)		Low Progress (N=8)		
Social Grouping	Mean	S.D.	Mean	S.D.	P
Alone	36.38	15.20	33.38	17.19	0.72
Pair	35.75	27.37	57.88	39.43	0.22
Small group	168.00	67.29	173.00	85.49	0.90
Large group	559.88	69.69	535.75	131.40	0.66

Note. 800 30-second intervals observed for each progress group

On examining the proportion of talk that occurred within these social groupings, table 5.14 shows that in general there were more occurrences of talking among children in the high progress centres (mean=0.45) than low progress centres (mean=0.40). However, results showed no significant differences between the two groups

Table 5.14

Comparison of Proportion of Verbal Interaction within Social Grouping by Word Reading Progress Groups

	High Progress (N=8)		Low Progress (N=8)		
Social Grouping	Mean	S.D.	Mean	S.D.	P
Pair	0.69	0.23	0.60	0.13	0.36
Small group	0.52	0.09	0.46	0.15	0.38
Large group	0.42	0.06	0.36	0.09	0.14
Total	0.45	0.06	0.40	0.08	0.14

Note. 800 30-second intervals observed for each progress group

5.7 Summary of comparison of child behaviours between language progress groups

In general, the results showed few significant differences in type of task activities and social interaction between high and low progress groups in language outcomes.

With regards to verbal comprehension, it was found that there were more cognitive activities in centres that had higher progress than centres with lower progress. On the other hand, more occurrences of daily routine were found among the low progress centres than the high progress ones. It is noted that there was a significant difference between progress groups in the frequency of disturbing behaviour, although such occurrences were very rare. It was also found that children in high progress centres were significantly more likely to be found in pairs more often than children in low progress centres. In contrast, children in low progress centres were found more often in large groups than children in high progress centres. On further examination of the amount of verbal interaction, no significant differences were established.

Investigation into the differences in task activities between high progress centres and low progress centres in word reading identified two significant results. It was found that children in lower progress centres engaged more in non-participatory activities than children in high progress centres. Also, these children were more occupied with daily routine activities compared with children from the high progress centres. However, no significant differences in social groups and verbal interaction were obtained.

Results concerning progress in verbal fluency did not establish any significant differences in either task activities or social interaction.

A general look at the trends suggested some consistent results in task activities across the three language outcomes. These were cognitive, fine/gross motor activities and daily routine. It appeared that on all three language outcomes, children in higher progress centres were engaged more in cognitive and fine and gross motor activities and less in daily routine than children from lower progress centres. It is also noted that with verbal comprehension and verbal fluency, there was more occurrence of social interaction in higher progress centres. Both these outcomes require interactive skills relating to speaking and listening, it may suggest that more opportunities for social interaction can enhance these skills.

Again, on looking for trends in the differences in social groupings across language outcomes, children in higher progress centres (for verbal comprehension and fluency) were found to be in small groups more than children in low progress centres. Conversely, children in low progress centres were found more in large groups than children in high progress centres. This seemed to suggest that smaller group size may help develop language skills.

Although in this small sample of 16 centres there were no statistically significant differences, it is interesting to note that a consistent trend was found. On all the language outcomes, the total proportion of children engaged in talk was found to be higher in high progress centres.

The constraint of the small sample size restricts firm conclusions in describing differences in child behaviours between high and low progress centres. Caution is also required in

inferring causes of progress in child outcomes as categories of behaviours were dependent. A low occurrence of a task activity may not necessarily have caused lower or higher progress as it may be limited by another task activity. For example, more occurrence in daily routine was found in centres that had low progress in verbal comprehension but this may be because it limited the time available for cognitive activities.

The results obtained so far suggested an underlying trend that requires further investigations. With a larger sample of centres it may be possible to identify child behaviours associated with centres which achieve higher than average progress across all outcomes, after adjusting for pre-test and other child characteristics.

CHAPTER SIX: DISCUSSION

6.1 Introduction

The findings of this study are discussed in two main parts. The first part consists of discussion and interpretation of the relationship between information collected in the centres (ECERS scores and Target Child Observations) and child outcomes. The most robust findings were those established after taking into account both home background and children's pre-test scores. Essentially this research involved two kinds of day care measures: the ratings of provision which make up the ECERS and the children's activities which were observed using the Target Child Observation method. Both sources of information on the centres were related to children's outcomes, although the ECERS proved to be the stronger predictor. These Singapore results are related to the findings of other researchers. The second part of this chapter discusses critical methodological contributions and limitations; and includes future research into pre-school effectiveness.

6.2. Validity and variation in 'quality'

Discriminant validity was established on the use of the ECERS in Singapore. Centres judged by independent experts as 'high quality' had higher ECERS scores than those judged as 'not high quality'. In general, the results showed that the better centres (as judged by experts) were rated higher on all seven ECERS subscales than the centres judged as 'not high'. More specifically, this study found three aspects of the day care environment that were significantly different in the two groups of centre judged by experts to be of discriminably different levels of 'quality'. These were provision of *language and*

reasoning experiences, *creative activities* and *social development*. These aspects of the day care involved more social interactive experiences and learning. The Singapore day care centres differed in the educational opportunities they offered children and these differences were related to differential child outcomes.

With reference to table 6.1, Singapore, when compared to other countries, has one of the lowest mean scores on the ECERS, with Bermuda and New Zealand only marginally ahead. Bolger and Scarr (1994) found a mean score of 3.00 in Virginia which is lower than Singapore. The Victoria Day Care project in Canada reported the highest mean of 4.62 with North Carolina following. It is noted that for most of these studies, a wider range of scores was obtained and with more variation in provision. Singapore is characterised by a smaller standard deviation which means less variation. The range of scores obtained was small and found around the 'minimal' rating which means that most centres were of low-average 'quality'.

This comparison across countries suggests that Singapore provides a low-average standard of day care for pre-school children. None of the item mean scores across centres (reported in table 3.9) were above 5 (i.e. 'good' provision). An above average rating (above five) indicates better provision of materials and schedule of activities as well as responsive and skillful adult-child interaction that shows sensitivity to individual needs. The ECERS raters noticed that the Singapore centres rarely achieved scores of six or seven because supportive and 'extending' adult-child interaction was lacking in most of them.

Table 6.1

Comparison of 'Quality' of Day Care Provision as Assessed by ECERS Across States/Countries.

Study	Country	N	Mean	Range	S.D.
Goelman & Pence (1988)	Victoria, Canada	25	171* (4.62)	-	22.26*
Dunn (1993)	North Carolina, USA	30	161.3* (4.36)	101-209* (2.7-5.6)	26.39*
Karrby (1994)	Gothenberg, Sweden	40	4.34	2.8-5.4	-
Bryant et al (1994)	USA (Head Start)	32	4.24	3.5-5.4	0.46
Bolger & Scarr (1994)	USA	122	Massachusetts=4.09 Virginia=3.00 Georgia=3.48	-	0.72 0.63 0.99
Schliecker, White & Jacobs (1991)	Montreal, Canada	11	High 'quality'=5.78 Low 'quality'=2.95	2.5-6.46	20* 15.3*
Beller, et al (1996)	Munich, Germany	32	3.91	2.2-4.2	0.47
Lera (1996)	UK	49	Public day nurseries=4.1 Private day nurseries=3.9	3-5	0.54 0.97
Kontos (1991) Kontos & Fiene (1987)	Pennsylvania, USA	10	3.78	3 -4.8	21.59*
Farquhar (1989)	New Zealand	8	3.71	-	0.38
McCartney (1982)	Bermuda	9	3.3	1.8-5.2	0.94
This study	Singapore	16	3.15	2.51-3.95	0.46

* Most studies report a mean score across all items, those that report only total scores are asterixed and their mean score calculated in brackets.

However, it is possible that the ECERS was not discriminating enough for Singapore. For example, *exceptional provision* and *room arrangements* had the lowest mean score, they were also positively skewed which means that most centres had the same score and were found at the lower end of the distribution. Centres in Singapore are not equipped for

providing for exceptional children; teachers are not specially trained for special needs and there is a lack of interest among school leavers to become special needs teachers. Thus, it has been difficult for directors of day care to enrol these children. Special children are usually enrolled in special schools in Singapore and most centres do not provide for them. Perhaps ECERS is not 'fair' to the different traditions of Singapore.

With regards to *room arrangements*, day care centres are either found in 'void decks' of government housing blocks or converted residential houses, so use of room or space can be multi-purpose and is optimally used. Although space is provided for each group of children, which contains tables, chairs and a rug area for group time, interest centres are not permanent features in the class rooms. If interest centres exist, they are usually shared by the whole centre for projects and themes. Therefore, on this item, it is not surprising that most centres scored low.

The rating on *adult meeting area* is generally low with a range of 1 - 3 which means that all the centres have a rating of below minimal. Most centres do have a special area for adult conferencing but it would be a multi-purpose one. Again, this can reflect the need to maximise use of space in most day care centres and reflects differing traditions concerning adequacy of facilities.

Other items are noted to be negatively skewed which means that most centres scored on the higher end of the range of scores. *Nap/rest* and *toileting* were distributed in the higher end of the range of scores. This shows a higher standard of provision in *personal and care routine*. This is because the Ministry of Community Development requires that

centres provide child-sized toilets and mattresses. This is rated a five or 'good' on the ECERS. Naptime and toileting are scheduled activities in Singapore because of the heat. Therefore, personal comfort is considered a priority for children and most children will have to shower, have a meal and then sleep for about two hours in the afternoon. Therefore, it is very rare to find a centre without this routine.

The discriminant validity established in this study has shown that the ECERS can identify standards of 'quality' distinguished by day care professional experts in Singapore. When compared with other studies, however, the findings suggest that these variations are not as wide as in many other countries. Further validity studies, described later in this chapter, will be neccessary to have confidence in the appropriateness of the ECERS in the Singapore context.

6.3 Day care 'quality' and linguistic development

Broadly, this study has found that the general 'quality' of day care was positively associated with verbal fluency after taking family background into account. This finding is consistent with that of McCartney's (1984) study in which children in higher 'quality' centres were better at verbal comprehension, production and fluency. Schliecker, White and Jacobs (1991) also reported significant and positive effects of ECERS 'quality' in enhancing vocabulary comprehension in four year olds. Moderate effect sizes were found by this present study and Schliecker's (ES=0.29 for both studies) and McCartney reported effect sizes ranging from moderate to large (ES=0.19 - 0.46).

McCartney and Schliecker also controlled for the effects of the family background when

examining the impact of ECERS on verbal fluency. For the Singapore study, family background such as mother's education, home activities and parental value were examined and none was found to be statistically related to progress in verbal fluency. However, one cannot conclude that these home background variables were not important. In contemporary jargon, use of pre-testing in this study might have 'mopped up' some of the effects of mother's education, home activities and parental values. Therefore, with pre-tests taken into account, home activities and parental values did not make an additional contribution to children's progress over the nine months of the study.

Interestingly in the Bermuda study, McCartney (1984) found an association between ECERS scores and verbal fluency. In Bermuda, higher parental value for social skills and lower value for conformity were associated with better language skills in children. In Singapore the failure to find an effect for parental values on children's outcomes might be explained by pre-test/post-test design used in this study. In Bermuda the researchers assessed children at only one time point; in Singapore, the pre-test scores included first in all regression equations might have 'taken up' much of the variance in parental values.

However, not all studies found a significant effect of day care 'quality' on language development; see Kontos and Fiene's (1987) and Goelman and Pence's (1988) studies. Phillips (1987) and Schliecker et al (1991) suggest that one of the reasons for this inconsistency could be due to different sample and methodology. For Kontos and Fiene's study in Pennsylvania, day care 'quality' across their ten centres ranged from minimal to good (3 to 4.8) and Goelman and Pence's study in Victoria, Canada, also reported an average rating of good 'quality' across the 25 centres sampled. These centres may have

reached a threshold of 'quality' where significant effects cannot be obtained. In comparison, the range of day care 'quality' found in McCartney's study was wider, from inadequate to good with a mean that was 'minimal'. This is the same with Schliecker's study in Montreal, Canada, in which a wide range from inadequate to near excellent was obtained. Although for Singapore, the range was not as wide (2.51 to 3.95), inadequate to just above minimal, the average 'quality' across the centres was minimal just like the Bermudian centres. In all three studies with significant effects, low 'quality' centres were included which seems to suggest that centres falling below a certain threshold of 'quality' are needed to show an association between children's language development and ECERS.

Interestingly, all the studies cited so far including this Singapore study have investigated the influence of mother's education on language development. Those studies (McCartney, 1984; Schliecker et al, 1991) that obtained significant effects for day care 'quality' on language scores did not show an influence of mother's education. These were the studies with lower mean scores on day care 'quality'. The opposite is true of the studies (Kontos & Fiene, 1991; Goelman & Pence, 1987) that did not obtain significant effects from day care 'quality' but found mother's education to be significantly associated with language development. These studies reported an above average 'quality' in day care. The results from this Singapore study support the findings from Bermuda and Montreal in that language scores were significantly associated with 'quality' of day care but not with mother's education.

A possible pattern can be hypothesised from these results. Home background factors such as mother's education may have a stronger association with language outcome if the

sample of day care centres used were better 'quality' ones. This is because the threshold of 'quality' has been reached and home background continued to be influential. Where the general standard of day care provision was lower (and in some cases more varying), a stronger and more robust relationship would exist between language outcome and day care 'quality. Therefore, mother's education would not be so important below this threshold of 'quality'.

These empirical findings show clearly the multi-dimensional nature of the child's learning environment. The evidence of this dynamic relationship between the 'quality' of day care and the home environment support Katz's (1993) suggestion that the home environment is likely to influence the level of stimulus from the day care environment. This also supports Melhuish's (1991) hypothesis that the effects of day care on children's development can be negative, positive or neutral depending on the relationship between the 'quality' of the home and the day care environment.

A centre effect was obtained for word reading progress; however, global day care 'quality' as measured on the ECERS was not found to be significantly associated with this outcome. Instead, particular aspects of the day care environment were significantly related to word reading and this will be discussed in section 6.5.

A centre effect on the last language outcome, verbal comprehension, was not found which can mean that there was a lack of variation in the outcome between the day care centres. A possible explanation is that the variance in verbal comprehension can be due to home backgrounds rather than nursery experiences. Analyses of the effects of home

background showed that mother's education and parental values were significantly associated with verbal comprehension. Children with better educated mothers (graduates) performed better in verbal comprehension. Also, of the three parental values, the parental value of self-direction showed the strongest association with verbal comprehension. These results support Kontos and Fiene's (1987) and Goelman and Pence's (1988) studies in which a positive effect of mother's education on language development was obtained. Both studies analysed mother's education concurrently with day care 'quality'. However, this Singapore study did not investigate the two variables concurrently as centre effects were not obtained. It is difficult to conclude much from this language outcome because of the possible weakness in the assessment used. There may have been a ceiling effect on this measure suggesting a possible inappropriateness of this instrument for children in this study.

In summary, results suggest a robust and positive relationship between day care 'quality' and verbal fluency even after taking home background into account. This is in keeping with results from other studies. Observations showed that Singapore centres that were rated higher 'quality' on the ECERS had more involved adults. Teachers spoke and played more with the children, especially during 'free play' sessions. Although most centres had adult directed whole class activities, which were highly structured lessons, teachers asked more questions, allowed participation and elicited response from the children. Language fluency could have been encouraged through this balance of structure in the timetable in which targets were consciously planned and at the same time opportunity was given to the children to express their ideas. It was observed that children were also encouraged to 'chatter' among themselves during structured tasks while

engaged in a structured tasks like writing, number work or an individual project. Teachers facilitated and 'picked up' topics of their conversations to extend children's discussion and they appeared to be interested and motivated in dialogue.

However, with regards to children's word reading and verbal comprehension, ECERS 'quality' does not appear to have a relationship with these skills.

6.4 Day care 'quality' and social-emotional behaviour

Day care 'quality' was found to be significantly related to considerateness in this study. There was also indication of a relationship between day care 'quality' and creative behaviour which can be of some educational importance. Some aspects of the day care environment were also associated with social-emotional behaviours and this is discussed in section 6.5. However, a centre effect was not established for children's self-esteem as measured on Harter's assessment of perceived competence and social acceptance.

Children who were more considerate and less hostile were found in day care centres with higher ECERS scores. This study also found that children who were more considerate came from homes where parents value social skills. When the effects of day care 'quality' and parent social value were examined concurrently, the effects of centre 'quality' lessened marginally with parental social value retaining a significant association. This implies that both 'quality' of day care and home encouragement of social skills are associated with considerateness in children.

Higher 'quality' day care centres in Singapore were observed to have a balance of

encouraging child independence and adult's support. This requires adults to be observant and skillful to facilitate self-help skills and pro-social behaviours among children. Teachers in the centres were observed to point out situations (as they happen) in the classroom that would heighten children's awareness of being sympathetic towards their friends. For example, praising and encouraging a child comforting another who has fallen over in the playground. In more obvious ways, staff consistently remind children of co-operating, sharing and saying 'please' and 'thank you'. Class equipment and educational toys are usually shared among small groups of children and this lends itself to promoting a 'sharing and caring' environment. In more subtle ways, 'waiting' for everyone to be ready at meal times before helping oneself to food and politely inviting the adult and then each other to eat first, are part of the larger cultural context that children live in Singapore. This is also reinforced by Singapore parents valuing social skills in the home environment. The nurseries and the parents are similar in their socialising activities, which makes it easier for children to develop these skills.

What is interesting is that this finding is again similar to the Bermuda study in social outcome. Phillips, McCartney and Scarr (1987) also reported that positive social behaviour such as sociability and considerateness in children were associated with higher 'quality' of day care and parental value of social skills. A possible explanation for this similarity can be the instruments used in the two studies. Both used the same teacher rating scale, Classroom Behaviour Inventory (Schaefer & Edgerton, 1978) to assess social behaviour and the ECERS to assess day care 'quality'. Phillips et al (1987) reported that using the Classroom Behaviour Inventory was "much more sensitive to differences in program quality" (p. 540) than were the other measures of social adjustment used by other

researchers. This study confirms the instrument's sensitivity to programme 'quality'.

It is possible that the same instruments could lead to different results in different countries because of the varied nature of population or of policy; however, this was not so for Bermuda and Singapore. Therefore, another possible explanation for this similar pattern of results is that the general 'quality' of day care in Bermuda is somewhat similar to Singapore. This is evident in the ECERS scores in which both countries have the mean score of around three which indicates that, in general, both countries have barely 'adequate' standard of day care provision. Perhaps these similarities warrant further investigation into the policies of both nations to find out if there are also similar social, cultural and economic factors that may contribute to day care provision in both countries.

On the other hand, similarities in the day care centres ('mesosystem' in Bronfenbrenner's theory) may not be related to similar government policies ('exosystem'). The ecological model of child development enables us to explore child care in the context of cultural similarities and differences.

Researchers can also learn from differences as well as similarities between countries. There can be subscale differences between both countries which might point to the shortcoming of global assessments. This is discussed in section 6.5. There may exist obscured profound differences in subscales ('microsystem') which may have been influenced by the differences in elements of the 'exosystem' in each country. For example, Singapore has a more authoritarian style of government and an environment that is highly structured whereas Bermuda is more democratic and less regulated. This contrast may

help explain different standards of provision in subscales between the two countries. This would be valuable educational and practical information for decision-making in day care in both countries.

Other studies that used different assessments of day care 'quality' have also found positive associations between 'quality' and social behaviours in children. Howes, Phillips and Whitebook (1992) created two dimensions of 'quality' from the ECERS which were developmentally appropriate activities and appropriate care giving. They found that higher scores on developmentally appropriate activities were positively associated with children who are more adult and peer oriented. Unfortunately, family background, e.g. values, was not explored in their study which limits the interpretation of their findings.

For this study, home background features such as the frequency of doing home work and parental values were associated with extravert behaviour in children. Less extraverted behaviour was associated with more home work and homes where parents value conformity and social skills. However, these home factors were partialled out when analysed concurrently with day care 'quality' represented by the subscale, *fine and gross motor activities*. (This 'quality' subscale was found associated with extravert behaviour). It can be said that the association between 'quality' of *fine and gross motor activities* and extravert behaviour remains significant but the effect of this variable is not stronger than family background. The influence of home work and parental values may still be important as these features might have contributed to the pre-test scores already.

Family background was also partialled out in Vandell, Henderson and Wilson's (1988)

study of social competence in children. They found that, after taking family social class into account, centres that were rated high on their composite measure of 'quality' had more children who were socially competent and spent more time in friendly interaction with others. The difference between Vandell's study and this study is that they did not include pre-test scores in their analyses which could have strengthened the influence of the home and weakened the effect of day care 'quality'.

With regards to children's self-esteem (perceived competence and social acceptance), centre effects were not established. This suggests that variation in these outcomes was associated with factors other than centre-related ones. Only parental value for conformity showed significant association with social acceptance. It is not surprising to find that children whose parents value conformity perceived themselves as less socially accepted; children may not feel socially competent when their parents require them to conform all the time. However, caution must be taken here again because the significant finding may be due to chance as no other significant effects related were obtained for self concept.

In summary, this study showed that higher day care 'quality' is associated with more considerate behaviour among children after taking home background into account. The subscale *fine and gross motor activities* was also related to extraverted behaviour in children after adjusting for home background. Furthermore, there is a trend showing a positive relationship between day care 'quality' and creative behaviour which may be of educational importance.

6.5 Aspects of day care 'quality' and child outcomes

The ECERS has been used by most researchers to assess total 'quality' of day care. Some researchers such as Scarr, Eisenberg and Deater-Deckard (1994) questioned the validity of the subscales. They went further to establish that any randomly selected 12 items from the ECERS will be sufficient to predict child outcomes. More precisely, the short-form ECERS scores from 12 items were as good at predicting child outcomes as the longer, global total score. However, the use of an abbreviated 'quality' score has some shortcomings.

One assumption made in using a global 'quality' index is that all subscales have equal weight in its association with child progress. Unfortunately some dimensions may be more important than others and not all dimensions may be related to overall progress. Also, using an overall 'quality' score does not tell us which aspect of the day care environment in a centre (or nation) is strong or weak in its 'quality'. Phillips (1987) argued that one centre may get an excellent rating on academic items and another may be excellent on social items but the two centres may have the same overall score. Therefore, there are possibilities of differential predictive power in subscales of the ECERS. It is suggested here that much further research using ECERS should be carried out before abandoning the subscales altogether.

The results of this study did not establish significant effects of total 'quality' day care on word reading skills. However, two aspects of the day care environment, *personal care/routine* and *adult needs*, were found to be significantly related to this outcome. This means that children with higher reading scores were found in centres where there were

more supportive interactions with caregivers especially during domestic routines. Domestic situations lend themselves to more informal learning, for example spontaneous reading encouraged by staff during meals and shower time. The caregivers' ability and awareness of the value of learning in these meaningful situations may reflect the good provision of 'adult needs', such as professional training and resources, that support good teaching practice.

Very few studies have investigated how well the ECERS subscales predict child outcomes. Beller, Stahnke, Butz, Stahl and Weβels' (1996) is one exception and they found three subscales associated with child progress, two of which were also found in this study. Beller reported significant associations between the subscales, *adult needs* and *language-reasoning experiences*, and child outcomes such as language, cognition and level of play. Provision of *personal care/ routines* was also reported to be positively associated with the outcome gross motor development.

A possible explanation for the associations between two subscales (*personal care/routines* and *adult needs*) and child outcomes is that these subscales may contain items that are homogeneous and these may be more accurate measures of personal care and adult needs. It is also interesting to note another similarity between Germany and Singapore. For both countries, the highest mean scores were obtained for *personal care/routines* and *furnishing and display* subscales. This shows that both countries value these aspects of the day care environment for children.

With regards to subscale associations with verbal fluency performance, all the subscales

except for *fine and gross motor activities* were significant predictors of fluency. *Fine and gross motor activities* relate more to physical development rather than verbal and it is not surprising that associations were not found. Again, caution needs to be taken here in interpreting results for the subscales; *language-reasoning*, *creative activities*, *furnishing and display* and *social development*. Prior analyses in this Singapore study has established that these four subscales correlate significantly with each other and therefore there may be an overlap of the constructs assessed. However, the results showed that of the four subscales, *social development* was the strongest predictor of verbal fluency. In brief, the general result for language development appeared to show that verbal fluency is more sensitive to the overall 'quality' of day care than is word reading.

This study also identified three subscales which were associated with more considerate and creative behaviour. These are *social development*, *fine and gross motor activities* and *personal care and routines*. This implies that children are more considerate and creative in centres which encourage social interaction and have better 'quality' of motor and domestic activities.

It was also established that there was a moderate and negative association between *personal care and routines* and creative behaviour in children. There are two possible explanations for this. The first is that although better adult-child interaction in domestic routines (a rating of 'good' to 'excellent') can facilitate incidental learning, this may be only within the domain of the task involved. It can be possible that in order for children to be more creative, they needed to be left on their own to explore. This may not be facilitated by adults in domestic activities. However, the second and perhaps more

plausible explanation is that this association may have arisen by chance and is spurious owing to the large number of analyses conducted in this study.

It was also found that higher scores for *language-reasoning experiences* and creative activities were given to centres whose children were rated as showing higher levels of creative behaviour. Needless to say, where centres provide cognitively rich and more expressive experiences children show more creative behaviour and more curiosity in learning.

Centres that were rated higher on *fine and gross motor activities* had children who are more extraverted. Also, centres that were rated higher on *social development* provision had children who are more independent. In contrast to the findings of this study, Beller et al (1996)did not find positive associations between subscales on ECERS and social-emotional outcomes in children. Instead, they found that observations of caregiver-child interactions were more predictive of social-emotional outcomes such as responsiveness, goal-directedness, aggression and fearfulness.

Needless to say, investigations into ECERS subscales have been sparse and the inconsistent results of this study with Beller's need to be interpreted with caution. However, the findings of this study do suggest that different aspects of the day care environment are associated with different child outcomes, at least in Singapore. Therefore this warrants further examination.

6.6 Systematic observations and child outcomes

Children in Singapore day care centres spent their time mainly in adult-led group activities, academic and domestic activities; these occupied 68.2% of their minute-by-minute experience. In comparison, studies in other countries reported a greater spread of activities over half of the daily programme in pre-schools. For example, Karrby (1991) used the Target Child Method to compare Swedish and British pre-schools and reported a wider variety of activities. In Sweden's full-day pre-schools, Karrby found that pretend play, social interaction, group activities, art, domestic activity and watching occupied 50.7% of day-to-day experiences. In Britain, children were found to engage in manipulation, pretend play, watching, large muscle movement, art and music 57.6% of time in pre-schools. Also, in Bahrain, Hadeed (1994) used the Target Child Method, and found children to be engaged in watching, domestic, academic and gross motor activities 57% of their day-to-day experience in pre-school. All activities reported here were the top three to six most frequent ones that amounted to over 50% of time observed.

Compared to Britain and Sweden (especially), in Singapore day care centres, children spend vast amounts of time in group activities which are basically adult-led teaching sessions. From conversations with parents and staff, it was found that these academic activities are valued by families and state. They focus on the teaching of basic literacy and numeracy skills through individual paper and pencil work. This is a contrast to western countries such as Sweden and Britain in which creative and play activities are more prevalent, presumably more valued by parents and staff. Interestingly, domestic activities were found to be the third most frequent activity in Singapore centres which is also identified by the ECERS as the third highest scoring subscale. The results of both ECERS

and the Target Child observations confirm that domestic provision is important in Singapore day care. This may be a result of the long day and the heat, or perhaps there is something about Singapore's culture which focuses on domestic routines related to being clean and tidy.

Where activities were concerned, it appeared that centres where children made progress in linguistic skills encouraged more cognitive activities as well as fine and gross motor activities. This supports the findings of Nabuco and Sylva (1995) in which centres encouraging problem-solving and literacy activities had children who made more progress in reading and writing. Using the same method of systematic observations, Hadeed and Sylva (1994) found that centres where they observed more cognitively challenging tasks were those classified as 'educational' rather than 'care' centres. These educationally-oriented pre-schools had children who had longer concentration span and higher intelligence scores. It can be speculated from these three studies that pre-school tasks that challenge and encourage problem-solving can enhance children's cognitive and language development later on, i.e., at post-test.

With regards to social settings, this study found that children who made higher progress in language outcomes came from centres that favoured smaller groups. In contrast, centres in which children made lower progress favoured larger groups. This supports the finding by Sylva, Roy and Painter (1980) that children playing in pairs tended to have higher scores on 'cognitive challenge' than those playing in large groups or alone.

This study also found that centres where more verbal interaction was observed had

children who made more language progress. Again this supports studies such as Nabuco and Sylva (1995) in which the activities of three different curricula groups were compared. They reported that High/Scope children engaged significantly more in informal conversation in pairs or small groups and had higher scores on literacy than children from two other curricula groups. The general findings are also consistent with studies like Rubenstein and Howes (1983), Melhuish et al (1990a) and Hadeed and Sylva (1994) in which they reported that children who performed better on language tasks came from day care centres where there was more adult verbal stimulation and more dialogue.

The general results of the observational part of this study are consistent with previous research in that language development is enhanced when children are placed in small groups and are more involved in dialogue. With regards to type of activities, Singapore appears to place more emphasis on group and academic activities compared with other countries in the west. However, in examining these activities in relation to child outcomes, there appear to be some consistency across countries. This is that cognitive challenging activities such as literacy games and stories, academic and problem-solving tasks are observed more often in centres whose children made greater progress in literacy development.

6.7 Reflections on methodology: Contributions and limitations

Some achievements and limitations of the study are discussed in this section. In general, this study has contributed to current day care research in three broad ways. Firstly, this is the first study that has validated the ECERS for use in Singapore and perhaps also in the region. Secondly, this study is one of the few in early education and care (except for

Melhuish et al, 1990a, 1990b and Beller et al, 1996) that has investigated children's developmental change over a time span in which pre-assessments were included. In other words, this is a design which establishes the value added by pre-school. Finally, in this study centre scores on ECERS have been used as child-level predictors. However, unlike most studies using this design, (McCartney, 1987; Kontos, 1991; Vandell et al, 1988; Burchinal et al, 1994; Dunn, 1993) the research in Singapore took a cautious stand in data analyses by first testing for centre effects on child outcomes before fitting a regression model in which ECERS scores were placed. Only those child outcomes for which centre effects were found were used subsequently in regression analyses exploring the relative contribution of the predictors. It is unfortunate that there was so little variation in the characteristics of day care, although some significant and/or important findings were established. However, some caution is required in interpretation and generalisation due to limitations in methods and measures which will be discussed.

The ECERS can only identify broad aspects of the day care environment. Most items focus on physical and programmatic features. Although the ratings of the ECERS do include the underlying features of caregiver involvement, the ECERS rankings for caregiver interaction are not precise. The more specific aspects of this feature such as characteristics of the caregiver and the nature of their interaction with children were not examined in this study. The addition of a scale for caregiver involvement such as the Arnett (1989) would have been a valuable supplement to the ECERS.

The findings of this study are also limited by the sample which was confined to centres which experts knew in common and on which they agreed on 'quality' assessment. As it

is recalled, for reasons of the discriminant validity exercise, 39 centres out of a population of 329 were identified by two experts as those they knew well enough to judge on their 'quality' of provision. However, it cannot be assumed that these 39 are representative of the spread of day care centres in Singapore. These 39 centres might be different from the rest because experts were frequently visiting them and were familiar with them. It is also possible that these centres were more open to researchers and they might be more confident centres.

The social-emotional outcomes in this study, except for the measure of self-esteem, were assessed by a teacher rating scale. Although significant associations between the child outcomes and aspects of day care 'quality' (ECERS) were established, caution needs to be taken. The interpretation of results should bear in mind that social outcomes were obtained from teachers' perceptions of children's behaviour. It is possible that this shortcoming was seen in some mismatch between teacher's perception of social-emotional behaviour and actual child behaviours observed (Target Child Observation).

Although the instrument used for assessing self-esteem directly involved the child, perhaps it was not sensitive to Singapore traditions and this can be a possible reason for the failure to find associations between it and ECERS. The children's scores were negatively skewed and this is not surprising because it was observed by this researcher that children were pleased to leave their routine to 'play' a game with the tester. It can be that children were eager to perform well for a new 'friend' and were in a positive mood which has nothing to do with how they really perceive themselves. Against this hypothesis, however, is the fact that the Harter scales are used in pre-school research in many other countries and the

self-esteem scores have been found to be related to aspects of care (Hadeed, 1994).

Observations of child behaviours obtained on the Target Child Method showed some relationship to child outcomes but it seems likely that the coding categories were not fine enough to identify important variations in Singapore centres. For example, group activities and academic activities took up a large proportion of the total time observed and the Target Child instrument was not able to discriminate subtle differences in the processes that went on during these activities that might have fostered children's development. Future research might sub-divide the '3Rs' category into finer activities.

In terms of statistical analyses, it must be noted that a great many tests were conducted in this study. Thus there is a risk that some of the significant findings may have occurred by chance.

6.8 Future research

While this study investigated the physical and programmatic environment of day care centres through the ECERS, it did not focus specifically on caregivers or on their interactions with children. However, caregiver characteristics such as level of education, training in child development and early childhood education have been shown by many researchers to influence child development (Arnett, 1989; Howes, 1983; Whitebook, Howes & Phillips, 1989). The nature of caregiver involvement with children has also been found to affect child development (Rubenstein & Howes, 1983, Melhuish et al, 1990b, McCartney, 1984, Nabuco & Sylva, 1995; Hadeed & Sylva, 1994). In addition, the adult working environment, which determines job satisfaction, has been found to influence

caregiver behaviour and hence child progress. For example, Whitebook, Howes and Phillips' study found that salary was the best predictor of job satisfaction. Higher salaries were associated with higher commitment to the job and lower turnover rates.

The ECERS assessed curricular aspects of the day care environment and it has been found in this study that the areas of language-reasoning, social development, and creative activities were significantly associated with child outcomes. It is likely that these involve processes such as interactions between adult and child; and the ECERS is not sensitive enough to identify them. It will be of benefit in future research to examine the effects of these staff-child interactions on child outcomes, perhaps using the caregiver-child interaction scale (Arnett, 1989).

There is current popular concern that the high turnover rate of teachers is creating an environment that may hinder children's progress. Variables such as salary, professional development and working environment for caregivers may be associated with this problem in Singapore. Future researchers might investigate the effects, if any, on children's outcomes, of interacting with a highly mobile staff. Research can also identify specific reasons for the current high turnover rate and suggest changes in policies that might alleviate the problem.

The ECERS has been used in many countries, mainly in the west. As the notion of what makes up 'quality' is subjective, there is a need to validate further the use of the ECERS in Singapore. It has been found in this study that certain items such as *toileting* and *exceptional provision* did not differ between centres. Therefore, it will be of benefit to

conduct a factor analysis on the items with a larger sample of centres in Singapore. Not only will information from this analysis be used to compare the results with countries in the west but also used as a springboard to day care 'quality' assessment in the Asian countries. The entire question of the validity of the seven ECERS subscales should be explored further in Singapore as well as in other countries.

The issue of 'quality' as subjective and value-ladened and is being explored by researchers (Moss, 1994; Weiss, 1995; Melhuish, 1991; Pence & Moss, 1994). Munton et al (1995) argued that the search for a single definition is fruitless and attempted to deconstruct the concept of 'quality' and placed the different ideas of 'quality' in relation to various perspectives of stakeholders. To extend this framework, an ambitious task for the future will be to investigate the various perceptions of what 'quality' is to stakeholders, with the aim to identify a common set of day care features that might lead to positive child outcomes. This can be an initial step towards agreement amongst stakeholders and allow a more objective definition of day care 'quality' at a national level first and perhaps, at an international level next, which will be a more onerous task.

In this study, for reasons of resources and economy, the 16 centres investigated were represented by one classroom each. Thus research investigated the effects of classrooms rather than centres. For example, teaching styles, classroom management and teacher attitude can vary from classroom to classroom within a centre and these differences can affect child progress. Therefore, it will be useful for future research to examine pre-school effectiveness at each level, namely child, classroom, centre and possibly governing authority. Needless to say, this will require adopting the multi-level modeling strategy for

(Goldstein, 1987; 1995) analysing data. Using a multi-level design will allow the researcher to untangle the shared variance in centres (or classes) due to ECERS from that due to unique characteristics such as a teacher with a particular style.

It has also been found in this study as well as others (Kontos & Fiene, 1987; Goelman & Pence, 1987; Chin-Quee & Scarr, 1994) that mother's education has a significant effect on child development, especially language development. The results always favour children with mothers with higher levels of education. Future research can include an experimental intervention programme for parent education within the pre-school centre. The practical consequence of intervention might be to compensate the disadvantaged. If the experimental intervention has an effect on child outcomes, a causal link will be established and will add scientific rigor to claims about the effects of pre-school programmes. Other interventions in Singapore might be an experimental approach to curriculum, with random assignment of children to conditions.

So far the home environment has been represented by factors which relate to mainly the characteristics of parents such as level of education, attitude and involvement with child. A unique feature in the Singapore child care situation is the presence of foreign domestic help at home. It is a unique situation where the employment of live-in domestic help is made affordable by government subsidies. Therefore, it is not uncommon for parents to enrol their children in full-day centre care and have domestic help in organising the daily routine of the home. The relationship between child and domestic help is generally close and interaction frequent, especially in families where both parents are at work most part of the day. There has been concern from parents that children's language development may

be hindered as most foreign domestic helpers speak little English, Chinese or Malay . It may be beneficial for future research to investigate possible confounding effects of this feature in the home environment in Singapore.

6.9 Implications for practice

The findings of this study have implications for practice. Some aspects of the day care environment are positively associated with child outcomes such as verbal fluency, creativity and considerateness. These outcomes are especially linked to the following areas of curriculum in the day care: language-reasoning experiences, creative activities, social development experiences and physical motor activities. Teacher education programmes should highlight the importance of cognitive skills such as problem-solving, decision making and creative thinking skills for children and focus on these cognitive skills in teacher training. Children in the day care centres will benefit from this emphasis of training as teachers will then be equipped with knowledge and skills to cultivate a new generation of innovators and creators for Singapore. Expressive, social and physical skills can also be facilitated in day care centres to help children develop confidence in social interactions that will support their worthy aspirations in the adult world.

Evaluating and improving programme 'quality' should not only include structural and programmatic aspects of the day care centre (the ones regulated by the Ministry of Community in Singapore) but also the interactive aspects. Activities planned for children should be meaningful and cognitively challenging in areas like reading, writing and mathematics. Cognitive tasks designed in the classroom should be personally purposeful and significant in the children's real world. Interactions between staff and children should

be positive but demanding, allowing for optimal challenge and independence which will bring personal satisfaction and reward.

In order to enhance cognitive, linguistic and social development, children might be more often encouraged to learn and play in small group settings of not more than five. This social structure facilitates more dialogue between peers which gives opportunities for children to express, argue, defend, appreciate each other's ideas and plans; and also negotiate and co-operate with one another. This is not to say that adults should leave them alone all the time, but they can facilitate these social interactions at appropriate points to optimise learning and understanding.

A pre-school curriculum can be designed to emphasise language, reasoning and creative activities which will facilitate the development of thinking skills. This is currently the agenda set by the Singapore government for all schools to focus on critical and creative thinking skills. The programme will also encourage social development such as self confidence, ability to engage in social interaction, sense of personal achievement and social consciousness. It can also involve putting children in small groups to engage in problem-solving tasks that require more dialogue, expression and appreciation of ideas.

Since higher level of mother's education was associated with greater language development in children, day care centres can intervene for those children whose mothers have less education. This can be done by organising a comprehensive parent programme which includes parent education courses on how to facilitate learning at home. Parental involvement in the day care centres can also be encouraged to build a closer relationship

and understanding with centre staff. Perhaps this will also create an awareness of how 'quality' day care is perceived by both parties, allowing for co-operation and adaptation of the day to day running of the centres.

Ultimately, providing 'quality' day care is an important item on most 'stakeholders' agenda. The aim for most is that children develop and learn to be personally responsible and become purposefully driven adults for family, society and nation as a whole. The various 'spheres of influence' surrounding children's 'microsystem' must continue to be flexible and accommodating to ensure such ideals for children and society.

A 'high quality' day care environment has been found to promote several aspects of child development in this Singapore study. Achieving high standards of day care 'quality' in Singapore is, therefore, essential to the well-being of young children and the nation. More universally, providing a supportive care and learning environment is a right for all children.

> *"The child shall enjoy special protection, and shall be given opportunities and facilities, by law and by other means, to enable him to develop physically, mentally, morally, spiritually and socially in a healthy and normal manner and in conditions of freedom and dignity. In the enactment of laws for this purpose, the best interests of the child shall be the paramount consideration."*
>
> *Declaration on the Rights of the Child*
> *United Nations, 20th November, 1959*

REFERENCES

Anderson, C. W., Nagle, R. J., Roberts, W. D., & Smith, J. W. (1981). Attachment to substitute caregivers as a function of center quality and caregiver involvement. Child Development, 52(1), 53-61.

Andersson, B. E. (1989). Effect of public day-care; a longitudinal study. Child Development, 60(4), 857-866.

Andersson, B. E. (1992). Effects of day care on cognitive and socioemotional competence of 13 year old Swedish school children. Child Development, 63(1), 20-36.

Arnett, J. (1989). Caregivers in day care centers. Does training matter? Journal of Applied Developmental Psychology, 10(4), 541-552.

Aureli, T., & Procaci, M. (1992). Day care experience and children's social development. Early Childhood Development and Care, 83, 45-54.

Ball, C. (1994). Start Right. The Importance of Early Learning. London: The Royal Society for the Encouragement of Arts, Manufactures and Commerce.

Behar, L., & Stringfield, S. (1974). A behaviour rating scale for the preschool child. Developmental Psychology, 10(5), 601-610.

Behar, L. (1977). The Preschool Behaviour Questionnaire. Journal of Abnormal Child Psychology, 5(3), 265-275.

Bekman, S. (1990). Alternative to the available: Home based vs centre based programs. Early Child Development and Care, 58, 109-119.

Beller, E. K., Stahnke, M., Butz, P., Stahl, W., & Webels, H. (1996). Two measures of the quality of group care for infants and toddlers. European Journal of Psychology of Education, 11(2), 151-168.

Belsky, J. (1984). Two waves of day-care research: Developmental effects and conditions of quality. In R. C. Ainslie (Ed.), The child and the day-care setting. Qualitative variations and development. (pp. 1-34). New York: Praeger Publishers.

Belsky, J. (1988). The 'effects' of infant day care reconsidered. Early Childhood Research Quarterly, 3(3), 235-272.

Belsky, J., & Steinberg, L. (1978). The effects of day care: A critical review. Child Development, 49(4), 929-949.

Belsky, J., Steinberg, L., & Walker, A. (1982). The ecology of day care. In M. E. Lamb (Ed.), Nontraditional families: Parenting and child development (pp. 71-116). Hillsdale, NJ: Erlbaum.

Belsky, J. & Walker, A. (1980). Infant-toddler center spot observation system. Unpublished manuscript, Department of Individual and Family Studies, Pennysylvania State University, University Park, PA 16802.

Berrueta-Clement, J. R., Schweinhart, W., & Weikart, D. P. (1983). Lasting effects of preschool education on children from low income families in the U.S. In International Development Research Centre, Preventing School Failure: The Relationship between Preschool and Primary Education (pp. 42-51). Ottawa, Ontario, Canada: The International Development Research Centre.

Berrueta-Clement, J. R., Barnett, W. S., Epstein, A., S. & Weikart, D. P. (1984). Changed lives: The effects of the Perry Preschool Program on youths through age 19. Monographs of the High/Scope Educational Research Foundation Volume 8. Ypsilanti, Michigan: High Scope Press.

Betts, D. (1991) Stressful life events in preschoolers: A cross-cultural study. Unpublished master's thesis, National University of Singapore, Singapore.

Blatchford, P., Burke, J., Farquhar, C., Plewis, I., & Tizard, B. (1987). A systematic observation study of children's behaviour at infant school. Research Papers in Education, 2(1), 47-62.

Blehar, M. (1974). Anxious attachment and defensive reactions associated with day care. Child Development, 45, 683-692.

Bolger, K. E., & Scarr, S. (1995). Not so far from home: How family characteristics predict child care quality. Early Development and Parenting, 4, 103-112.

Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. American Psychologist, 32(7), 513-531.

Bronfenbrenner, U. (1979a). Contexts of child rearing problems and prospects. American Psychologist, 34(10), 844-850.

Bronfenbrenner, U. (1979b). Day care and preschool as context of human development. In U. Bronfenbrenner (Ed.), The ecology of human development: experiments by nature and design (pp. 164-205). Cambridge: MA: Harvard University Press.

Broberg, A. & Hwang, C. P. (1991). Swedish child care research. In E. C. Melhuish & P. Moss (Eds.), Day care for young children. International perspectives (pp. 75-101). London: Routledge.

Brophy, J., & Statham, J. (1994). Measure for measure: Values, quality and evaluation. In P. Moss & A. Pence (Eds.), Valuing quality in early childhood services. New approaches to defining quality (pp. 61-75). London: Paul Chapman.

Bryant, D. M., Burchinal, M., Lau, L. B., & Sparling, J. J. (1994). Family and classroom correlates of Head Start children's developmental outcomes. Early Childhood Research Quarterly, 9(1), 33-61.

Burchinal, M., Lee, M., & Ramey, C. (1989). Type of day-care and preschool intellectual development in disadvantaged children. Child Development, 60(1), 128-137.

Burchinal, M. R., Ramey, S. L., Reid, M. K., & Jaccard, J. (1995). Early child care experiences and their association with family and child characteristics during middle childhood. Early Childhood Research Quarterly, 10(1), 33-61.

Chang, A. (1993). Child and adolescent development: Anticipation of the future challenges and problems with special reference to Singapore. In The 7th Asian Workshop on Child and Adolescent Development, Jakarta, Indonesia.

Chin-Quee, D. S., & Scarr, S. (1994). Lack of early child care effects on school age children's social competence and academic achievement. Early Development and Parenting, 3(2), 103-112.

Clarke-Stewart, A. (1987a). The social ecology of early childhood. In E.N. (Eds.), Contemporary topics in developmental psychology. (pp. 292-318). New York: Wiley.

Clarke-Stewart, A. (1987b). Predicting child development from child care forms and features: The Chicago Study. In D. Phillips (Ed.), Quality in Child Care: What Does Research Tell Us? (pp. 21-41). Washington DC, U.S.A.: National Association for the Education of Young Children.

Clarke-Stewart, A. (1987c). In search of consistencies in child care research. In D. Phillips (Eds.), Quality in Child Care: What Does Research Tell Us? (pp. 105-120). Washington D.C., U.S.A: National Association for the Education of Young Children.

Clarke-Stewart, A., (1991). Day care in U.S.A. In E. C. Melhuish & P. Moss (Eds.), Current issues in day care for young children. Research and policy implications (pp. 35-60). London: HMSO.

Clarke-Stewart, A., & Gruber, C. (1984). Day care: A new context for research and development. In M. Perlmutter (Ed.), The Minnesota Symposia on Child Psychology. Parent-child Interaction and Parent-child Relation in Child Development (pp. 61-100). Hillsdate, NJ: Erlbaum.

Cochran, M. M. (1977). A comparison of group day care and family child-rearing patterns in Sweden. Child Development, 48(2), 702-707.

Cohen, J. (1960). A coefficient of agreement for nominal scales. Educational and Psychological Measurement, 10, 37-46.

Cohen, J. (1977). Statistical Power Analysis for the Behavioural Sciences. New York: Academic Press.

Davis, N. S., & Thornburg, K. R. (1994). Child care: A synthesis of research. Early Child Development and Care, 98, 39-45.

Deater-Deckard, K., Pinkerton, R., & Scarr, S. (1996). Child care quality and children's behavioural adjustment: A four year longitudinal study. Journal of Child Psychology and Psychiatry, 37(8), 937-948.

Department of Social Welfare (1975). Annual Report. Singapore.

Department of Statistics (1992). Yearbook of statistics, Singapore. Singapore: Department of Statistics.

Department of Statistics (1994). Yearbook of statistics, Singapore. Singapore: Department of Statistics.

Department of Welfare (1946). Beginnings: The first report of the Singapore Department of Social Welfare. Singapore.

Doherty, L. (1991). Quality matters in child care. Huntsville, Ontario, Canada: Jesmond Publishing.

Donebedian, A. (1980). Explorations in quality assessment and monitoring. Volume 1. The definition of quality and approaches to its assessment. Ann Arbor, Michigan: Health Administration Press.

Dunn, L. (1993). Proximal and distal features of day care quality and children's development. Early Childhood Research Quarterly, 8(2), 167-192.

Elliott, C. D. (1983). British ability scales. England: NFER-Nelson.

Farquhar, S. (1989). Assessing New Zealand child day care quality using the Early Childhood Environment Rating Scale. Early Child Development and Care, 47, 93-105.

Farquhar, S. (1990). Quality in early education and care: What do we mean? Early Child Development and Care, 64, 71-83.

Gamble , T. J., & Zigler, E. (1986). Effects of infant day care: Another look at evidence. American Journal of Orthopsychiatry, 56(1), 26-42.

Glossop, R. G. (1988). Bronfenbrenner's ecology of human development: A reappreciation. In A. Pence (Ed.), Ecological research with children and families (pp. 1-15). New York: Teachers College Press.

Goelman, H. (1988). The relationship between structure and process variables in home and day care settings on children's language development. In A. Pence (Ed.), Ecological Research with Children and Families: From Concepts to Methodology (pp. 16-34). New York: Teachers College Press.

Goelman, H., & Pence, A. (1987). Effects of child care, family and individual characteristics on children's language development: The Victoria Day Care Research Project. In D. Phillips (Ed.), Quality in Child Care: What Does Research Tell Us? (pp. 89-104). Washington DC, U.S.A: National Association for the Education of Young Children.

Goelman, H., & Pence, A. (1988). Children in three types of day care: Daily experiences, quality of care and developmental outcomes. Early Child Development and Care, 33(1-4), 67-76.

Goldstein, H. (1987). Multilevel models in educational and social research. London: Griffin.

Goldstein, H. (1995). Multilevel statistical models. London: Edward Arnold.

Hadeed, J. (1994) The effects of preschool experience on some aspects of child development in Bahrain. Unpublished doctoral dissertation, University of London, Institute of Education.

Harms, T., & Clifford, R. M. (1982). Assessing preschool environments with the Early Childhood Environmental Rating Scale. Studies in Educational Evaluation, 8(3), 261-269.

Harms, T. & Clifford, R. M. (1980). Early Childhood Environmental Rating Scale. New York: Teachers College Press.

Harms, T. & Clifford, R. M. (1986). Infant-toddler Environment Rating Scale. New York: Teachers College Press.

Harms, T. & Clifford, R. M. (1989). Family Day Care Rating Scale. New York: Teachers College Press.

Harms, T., & Clifford, R. M. (1993). Studying educational settings. In B. Spodek (Ed.), Handbook of Research on the Education of Young Children (pp. 477-492). New York: McMillan Publishers.

Harms, T., Clifford, R. M. & Padan-Belkin, E. (1983). The Day Care Home Environment Rating Scale. Homebased Day Care Training Project. Chapell Hill, North Carolina: Frank Porter Graham Child Development Center.

Harms, T., Jacobs, E. V. & White, D. R. (1996). School-Age Care Environmental Rating Scale. New York: Teachers College Press.

Harter, S., & Pike, R. (1983). The Pictorial Scale of Perceived Competence and Social Acceptance for Young Children. Procedural manual. Denver: University of Denver.

Harter, S., & Pike, R. (1984). The Pictorial Scale of Perceived Competence and Social Acceptance for Young Children. Child Development, 55(6), 1969-1982.

Haskins, R. (1985). Public school aggression among children with varying day-care experience. Child Development, 56, 689-703.

Hill, P. S. (November, 1900). The future of kindergarten. Teachers College Record, 10, 48. (as cited in Harms, T. & Clifford, R. M., 1982).

Holloway, S. D., & Reichart-Erickson, M. (1988). The relationship of day care quality to children's free play behaviour and social problem solving skills. Early Childhood Research Quarterly, 3(1), 39-53.

Howes, C. (1983). Caregiver behaviour in centre and family day care. Journal of Applied Developmental Psychology, 4(1), 99-107.

Howes, C. (1987). Social competency with peers: Contributions from child care. Early Childhood Research Quarterly, 2(2), 155-167.

Howes, C. (1988). Relations between early child care and schooling. Developmental Psychology, 24(1), 53-57.

Howes, C. (1990). Can the age of entry into child care and the quality of child care predict adjustment in kindergarten? Developmental Psychology, 26(2), 292-303.

Howes, C. & Olenick, M. (1986). Family and child care influences on toddler's compliance. Child Development, 7(1), 202-216.

Howes, C., Phillips, D., & Whitebook, M. (1992). Thresholds of quality: Implications for the social development of children in center-based child care. Child Development, 63(2), 449-460.

Howes, C., & Stewart, P. (1987). Child's play with adults, toys and peers: An examination of family and child care influences. Developmental Psychology, 23(3), 423-430.

Hwang, C. P. (1991). Day care in Sweden. In E. C. Melhuish & P. Moss (Eds.), Current issue in day care for young children. Research and policy implications (pp. 61-81). London: HMSO.

Hwang, C. P. & Broberg, A. G. (1992). The historical and social context of child care in Sweden. In Lamb, M. E., Hwang, C. P. & Broberg, A. (Eds.), Child care in context: Cross-cultural perspectives (pp. 27-54). Hillsdale, NJ: Erlbaum.

Hwang, C. P., Broberg, A., & Lamb, M. E. (1991). Swedish child care research. In E. C. Melhuish & P. Moss (Eds.), Day Care for Young Children. International Perspectives (pp. 102-120). London, UK: Tavistock/Routledge.

Jacobs, E., & White, D. R. (1994). The relationship of child care quality and play to social behaviour in the kindergarten. In H. Goelman & E. Jacobs (Eds.), Children's Play in Child Care Settings (pp. 85-101). Albany, New York: State University of New York.

Jowett, S. & Sylva, K. (1986). Does kind of preschool matter? Educational Research, 28(1), 21-31.

Karrby, G. (1988). Time structure and sex differences in Swedish preschools. Early Child Development and Care, 39, 45-52.

Karrby, G. (1991). Comparison between Swedish and British preschools of children's activities, language and group constellation. In 5th Early Childhood Convention, 8th-12th September. Dunedin, New Zealand:

Karrby, G. (1995). Parental conceptions of quality in day care centres in relation to quality measured by the ECERS. Early Child Development and Care, 110, 1-18.

Karrby, G., & Giota, J. (1994). Dimensions of quality in Swedish day care centres. An analysis of the Early Childhood Environment Rating Scale. Early Child Development and Care, 104, 1-22.

Katz, L. (1993). Multiple perspectives on the quality of early childhood programmes. European Early Childhood Education Research Journal, 1(2), 5-9.

Katz, L. (1994). Perspective on the quality of early childhood programmes. Phi Delta Kappan, 76(3), 200-205.

Kerlinger, F. N. (1986). Foundations of behavioural research. Orlando, Florida: Holt, Rinehart & Winston.

Ko, P. S., & Ho, W. K. (Ed.). (1992). Growing up in Singapore. The preschool years. Singapore: Longman.

Kontos, S. J. (1991). Child care quality, family background and children's development. Early Childhood Research Quarterly, 6(2), 249-262.

Kontos, S., & Dunn, L. (1993). Caregiver practices and beliefs in child care varying in developmental appropriatenss and quality. In S. Reifel (Ed.), Advances in early education and day care: Perspective in developmentally appropriate practice (pp. 53-74). JAI Press Inc.

Kontos, S. & Fiene, R. (1987). Child care quality, compliance with regulations and children's development: The Pennsylvania Study. In D. A. Phillips (Ed.) Quality in child care: What does research tell us? (pp. 57-79). Washington DC: National Association of Education for Young Children.

Lamb, M. E., Hwang, C. P., & Bookstein, F. L., Broberg, A., Hult, G. & Frodi, M. (1988). The development of social competence in Swedish preschools. Developmental Psychology, 24(1), 58-70.

Lamb, M. E., Hwang, C. P., Broberg, A., & Bookstein, F. L. (1988). The effects of out-of-home care on the development of social competence in Sweden: A longitudinal study. Early Childhood Research Quarterly, 3(4), 379-402.

Larsen, J. M., & Robinson, C. C. (1989). Later effects of preschool on low-risk children. Early Childhood Research Quarter, 4(1), 133-144.

Lazar, I., & Darlington, R. (1980). Lasting Effects After Preschool. Summary Report No. U.S. Department of Health and Human Services. Offices of Human Development and Services. Administration for Children, Youth and Families.

Lee, V. E., Schnur, E., & Brooks-Gunn, J. (1988). Does Head Start work? A one-year follow-up comparison of disadvantaged children attending Head Start, no preschool and other preschool programmes. Developmental Psychology, 24(2), 210-222.

Lee, V. E., Brooks-Gunn, J. Schnur, E. & Liaw, F. R. (1990). Are Head Start effects sustained? A longitudinal follow-up comparison of disadvantaged children attending Head Start, No Preschool and Other Preschool programs. Child Development, 61(2), 495-507.

Lera, M., Owen, C., & Moss, P. (1996). Quality of educational settings for four-year-olds in England. European Early Childhood Education Research Journal, 4(2), 21-33.

Lero, D. S. (1988). The potential role of national surveys as a tool in understanding the ecology of child care. In A. Pence (Ed.), Ecological research with children and families (pp. 76-98). New York: Teachers College Press.

Lim, A. S. E. (1994). Relationship of play and language patterns among Singaporean preschool children in homes and classrooms. International Journal of Early Years Education, 2(2), 65-91.

McCartney, K. (1984). Effect of quality of day care environment on children's language development. Developmental Psychology, 22(2), 244-260.

McCartney, K., Scarr, S., Phillips, D., & Grajek, S. (1985). Day care as intervention: Comparisons of varying quality programmes. Journal of Applied Developmental Psychology, 6(2-3), 247-260.

McCartney, K., Scarr, S., Phillips, D., Grajek, S., & Schwarz, J. C. (1982). Environmental differences among day care centers and their effects on children's development. In E. F. Zigler & E. W. Gordon (Eds.), Day Care. Scientific and Social Policy Issues (pp. 126-151). Boston, MA: Auburn.

McKey, R. H., Condelli, L., Ganson, H., Barrett, B. J., McConkey, C., & Plantz, M. C. (1985). The Impact of Head Start on Children, Families and Communities. Final Report of the Head Start Evaluation, Synthesis and Utilisation Project. Washington, DC: CSR.

Maxwell, R. (1984). Quality assessment in health. British Medical Journal, 288, 1470-1472.

Melhuish, E. (1993). Preschool care and education: Lessons from the 20th for the 21st century. International Journal of Early Years Education, 1(2), 19-32.

Melhuish, E. C. (1991a). Cross-national comparisons and the interpretation of day care effects. Journal of Reproductive and Infant Psychology, 9(2-3), 63-65.

Melhuish, E. C. (1991b). Research issues in day care. In E. C. Melhuish & P. Moss (Eds.), Current issues in daycare for young children. Research and policy implications (pp. 20-34). London: HMSO.

Melhuish, E. C. (In press). The quality of care and attachment. In A. Walker & K. Niven (Eds.), The Psychology of Reproduction. Current Issues in Infancy and Parenthood London: Butterworth Heinemann.

Melhuish, E. C., Lloyd, E., Martin, S., & Mooney, A. (1990a). Type of childcare at 18 months -II. Relations with cognitive and language development. Journal of Child Psychology and Psychiatry, 31(6), 861-870.

Melhuish, E. C., Mooney, A., Martin, S., & Lloyd, E. (1990b). Type of childcare at 18 months -I. Differences in interactional experience. Journal of Psychology and Psychiatry, 31(6), 849-859.

Melhuish, E. C., Martin, S. & Mooney, A. (1991). Differing experiences of three-year-old children within various types of child care. Journal of Reproductive and Infant Psychology, 9, 181-189.

Melhuish, E. C., & Moss, P. (Eds.). (1991). Day Care for Young Children. International Perspectives. London, UK: Tavistock/Routledge.

Ministry of Community Development (1993). Annual Report. Singapore.

Ministry of Labour (1995). Profile of the labour force of Singapore, 1983-1994. Singapore: Research and Statistics Department.

Ministry of Social Affairs (1980). Annual Report. Singapore.

Morrison, C. S. (1995). Early childhood education today (6th ed.). New York: Maxwell Maximillan International

Moskowitz, D. S., Schwarz, J. C., & Corsini, D. A. (1977). Initiating day care at 3 years of age: Effects on attachment. Child Development, 48, 1271-1276.

Moss, P. (1991). Day care policy and provision in Britain. In E. C. Melhuish & P. Moss (Eds.), Current issue in day care for young children. Research and policy implications (pp. 82-94). London: HMSO.

Moss, P. (1994). Defining quality: values, stakeholders and processes. In P. Moss & A. Pence (Eds.), Valuing quality in early childhood services. New approaches to defining quality (pp. 1-9). London, U. K.: Paul Chapman Publishing.

Moss, P., Owen, C., Statham, J., Bull, J., Cameron, C., & Candappa, M. (1995). Survey of Day Care Providers in England and Wales. A Working Paper from the TCRU Children Act Project. London, England: Thomas Coram Research Unit.

Moss, P., & Pence, A. (Ed.). (1994). Valuing Quality in Early Childhood Services. New Approaches to Defining Quality. London, UK: Paul Chapman Publishing.

Munton, A., Mooney, A., & Rowland, L. (1995). Deconstructing quality: A conceptual framework for the new paradigm in day care provision for the under eights. Early Child Development and Care, 114, 11-23.

Munton, A., Rowland, L., Mooney, A., & Lera, M. (1997). Using the Early Childhood Environment Rating Scale (ECERS) to evaluate quality of nursery provision in England: some data concerning reliability. Educational Research, 39(1), 99-104.

Nabuco, M.E. (1997). The effects of three early childhood curricula in Portugal on children's progress in the first year of primary school. Unpublished doctoral thesis. University of London, Institute of Education.

Ong, W. H. (1977). Job creation or job loss? Singapore: National Trade Union Congress.

Osborn, A. F., & Milbank, J. E. (1987). The effects of early education. A report from the Child Health and Education Study. Oxford, UK: Clarendon Press.

Phillips, D. (Ed.). (1987). Quality in child care: What does research tell us? Washington DC: National Association for the Education of Young Children.

Phillips, D., McCartney, K., & Scarr, S. (1987). Child care quality and children's social development. Developmental Psychology, 23(4), 537-543.

Phillips, D. (1991). Day care for young children in the United States. In E. C. Melhuish & P. Moss (Eds.), Day care for young children. International perspectives (pp. 161-184). London: Tavistock/Routledge.

Plewis, I. (1985). Analysing change. Measurement and explanation using longitudinal data. Chichester, UK: John Wiley & Sons.

Ragozin, A. S. (1980). Attachment behaviour of day care children: naturalistic and laboratory observations. Child Development, 51 (2), 409-415.

Ramey, C. T., Dorval, B., & Baker-Ward, L. (1983). Group day care and socially disadvantaged families: Effects on the child and the family. In S. Kilmer (Ed.), Advances in early education and day care (pp. 69-105). Greenwich, Connecticut: JAI Press.

Rossbach, H. G., Clifford, R. M. & Harms, T. (1991). Cross-national validation of the ECERS. Paper presented at the American Educational Research Association Annual Conference, Chicago, IL.

Roupp, R. R., Travers, J., Glantz, F. & Coelen, C. (1979). Children at the center: Final report of the National Day Care Study. Cambridge, MA: Abt Associates.

Rubenstein, J. L., & Howes, C. (1979). Caregiving and infant behaviour in day care and in homes. Developmental Psychology, 15(15), 1-24.

Rubenstein, J. L., & Howes, C. (1983). Social-emotional development of toddlers in day care: The role of peers and of individual differences. In S. Kilmer (Eds.), Advances in early education and day care (pp. 13-45). Greenwich, Connecticut: JAI Press.

Rubenstein, J. L., Howes, C., & Boyle, P. (1981). A 2-year follow-up of infants in community-based day care. Journal of Child Psychology and Psychiatry, 22(3), 209-218.

Sameroff, A. J. (1987). The social context of development. In N. Eisenberg (Eds.), Contemporary topics in developmental psychology (pp. 273-291). New York: Wiley.

Scarr, S., Eisenberg, M., & Deater-Deckard, K. (1994). Measurement of quality in child care centers. Early Childhood Research Quarterly, 9(2), 131-151.

Schaefer, E. S., & Edgerton, M. (1978). Classroom Behaviour Inventory. Preschool Form. (Research edition ed.). Princeton, NJ: Educational Testing Service.

Schaefer, E. S., Edgerton, M., & Comstock, M. S. (1977). Description of parent as educator interview (Fall ed.). Chapel Hill, NC: University of North Carolina.

Schliecker, E., White, D. R., & Jacobs, E. (1991). The role of day care quality in the prediction of children's vocabulary. Canadian Journal of Behavioural Science, 23(1), 12-24.

Schweinhart, L. J., Berrueta-Clement, J. R., Barnett, W. S., Epstein, A. S. & Weikart, D. P. (1985). Effects of the Perry Preschool Program on youths through age 19: A summary. Topics in Early Childhood Special Education Quarterly, 5 (2), 26-35.

Schweinhart, L. J., Barnes, H. V., Weikart, D. P., Barnett, W. S. & Epstein, A. S. (1993). Significant Benefits. The High/Scope Perry Preschool Study Through Age 27. Monographs of the High Scope Educational Research Foundation Volume 10. Ypsilanti, Michigan: The High/Scope Press.

Schweinhart, L. J. & Weikart, D. P. (1980). Young children grow up: The effects of the Perry Preschool Program on youths through age 15. High/Scope Educational Research Foundation. Ypsilanti, Michigan: The High/Scope Press.

Schweinhart, L. J. & Weikart, D. P. (1997). Lasting differences: The High/Scope pre-school curriculum comparison study through age 23. (Monographs of the High/Scope Educational Research Foundation, 11). Ypsilanti, Michigan: High/Scope Press.

Schweinhart, L. J., Weikart, D. P., & Larner, M. B. (1986). Consequences of 3 preschool curriculum models through age 15. Early Childhood Research Quarterly, 1(15), 15-45.

Seng, S. H. (1992). Cognitive and social development of preschool -gender differences. In Annual Meeting of the American Educational Research Association. San Francisco, California.

Seng, S. H. (1994). Quality of kindergarten education in Singapore: Parents' views and expectations. Paper presented in the XIIIth Biennial Meeting of the International Society for the Study of Behavioural Development. Amsterdam, The Netherlands.

Seng, S. H., & Lazar, I. (1992). Early childhood education in Singapore. In S. Feeney (Ed.), Early childhood education in Asia and the Pacific (pp. 165-173). New York: Garland.

Sharpe, P. (1994). A study of some of the environmental features found to be conducive to the bilingual development of preschool children in Singapore. Early Child Development and Care, 98, 59-72.

Smith, P. K., & Connolly, K. J. (1986). Experimental studies of the preschool environment: The Sheffield Project. In S. Kilmer (Ed.), Advances in Early Education and Day Care (pp. 27-67). Greenwich, Connecticut: JAI Press.

Smith, T., Moore, E., & Sylva, K. (1987). The High Scope approach to early years. OMEP Update: Current Issues in Early Childhood (22, November).

Sylva, K., & Moss, P. (1992). Learning before school. National Commission on Education. Briefing No. 8. Paul Hamlyn Foundation.

Sylva, K., Roy, C., & Painter, M. (1980). Childwatching at playgroup and nursery school. Oxford Preschool Project. London: Grant McIntyre Ltd.

Sylva, K., Smith, T., & Moore, E. (1985). Monitoring the High/Scope training programme: Final report. Department of Social and Administrative Studies, University of Oxford.

Sylva, K., Melhuish, E. C., Sammons, P. & Siraj-Blatchford, I. (1996). Effective provision of pre-school education. A five-year study funded by the Department of Education and Employment. Institute of Education, University of London.

Thornburg, K. R., Pearl, P., Crompton, D., & Ispa, J. M. (1988). Developmental of kindergarten children based on child care arrangements. Early Childhood Research Quarterly, 5(1), 27-42.

Tizard, B., Philips, J., & Plewis, I. (1976). Play in preschool centre -II. Effects on play of the child's social class and of the educational orientation of the centre. Journal of Child Psychology and Psychiatry, 17(4), 265-274.

Tizard, B., Philips, K., & Plewis, I. (1976). Play in preschool centres -I. Play measures and their relation to age, sex and IQ. Journal of Child Psychology and Psychiatry, 17(4), 251-264.

Tzelepis, A., Giblin, P. T., & Agronow, S. J. (1983). Effects of adult-caregiver's behaviours on the activities, social interactions and investments of nascent preschool day care groups. Journal of Applied Developmental Psychology, 4(2), 201-216.

Vandell, D. L., & Corasaniti, M. A. (1990). Child care and the family: Complex contributors to child development. New Directions for Child Development. Child Care and Maternal Employment: A Social Ecology Approach (49, Fall), 23-37.

Vandell, D. L., Henderson, V. K., & Wilson, K. S. (1988). A longitudinal study of children with day care experience of varying quality. Child Development, 59, 1286.

Vandell, D. L., & Powers, C. P. (1983). Day care quality and children's free play activities. American Journal of Orthopsychiatry, 53(3, July), 493-500.

Wasik, B. H., Ramey, C. T., Bryant, D. M., & Sparling, J. J. (1990). A longitudinal study of two early intervention strategies: Project CARE. Child Development, 61(5), 1682-1696.

Weikart, D., Rogers, L., Adcock, C., & McClelland, D. (1971). The cognitively orientated curriculum. Urbana, Illinois and Washington DC: Educational Resources Information.

Weikart, D. P., & Schweinhart, L. J. (1991). Disadvantaged children and curriculum effects. New Directions for Child Development, (53, Fall), 57-64.

Weiss, S. (1995). Quality in child care institutions and the relationship between care and education in Denmark. International Journal of Early Childhood, 27(1), 41-47.

Whitebook, M., Howes, C., & Phillips, D. (1989). Who cares? Child care teachers and the quality of care in America. The National Child Care Staffing Study. Oakland, CA: Child Care Employee Project.

Woodhead, M. (1985). Preschool education has long-term effects: But can they be generalised? Oxford Review of Education, 11(2), 133-155.

Woodhead, M. (1990). Transactional models of early education effectiveness -What is the message for policy? Early Child Development and Care, 58, 129-141.

Woodhead, M. (1996). In search of the rainbow. Pathways to quality in large-scale programmes for young disadvantaged children. The Hague: Bernard van Leer Foundation.

Zigler, E., & Styfco, S. J. (1994). Is the Perry Preschool better than Head Start? Yes or no. Early Childhood Research Quarterly, 9(3-4), 269-287.

Appendix A

Example of day care centre programme

	N1 Lollipop	N1 Lollipop	N1 Lollipop	N1 Lollipop	N2 Candy	N2 Candy	K1 Sunshine	K2 Rainbow
7:00 to 8:30	ASSEMBLY	ASSEMBLY	ASSEMBLY	ASSEMBLY	ASSEMBLY	ASSEMBLY	ASSEMBLY	ASSEMBLY
8:30 to 9:00	BREAKFAST	BREAKFAST	BREADFAST	BREAKFAST	BREAKFAST	OUTDOOR	DAIRY	QUIET ACTIVITY
9.00 to 9.30	LANG OR MATHS	LANG OR MATHS	OUTDOOR	OUTDOOR	ART OR MUSIC	BREAKFAST	BREAKFAST	BREAKFAST
9:30 to 10:00	OUTDOOR	OUTDOOR	LANG OR MATHS	BATH	LANG	MUSIC OR ART	MATHS	DAIRY
10.00 to 10.30	2ND LANG	2ND LANG	BATH	ART	OUTDOOR	LANG	2ND LANG	ART OR MUSIC
10.30 to 11.00	BATH	BATH	ART	LANG OR MATHS	MATHS	2ND LANG	ART OR MUSIC	OUTDOOR
11:00 to 11:30	ART	MUSIC	MUSIC	2ND LANG	BATH	MATHS	OUTDOOR	MATHS
11:30 to 12:00	MUSIC	LUNCH	LUNCH	MUSIC	2ND LANG	LUNCH	BATH	2ND LANG
12:00 to 12:30	LUNCH	ART	2ND LANG	LUNCH	LUNCH	BATH	LANG	LANG
12:30 to 1:00	TV	NAP	NAP	TV	TV	TV	LUNCH	LUNCH
1.00 to 1.30	NAP	NAP	NAP	NAP	NAP	NAP	TV	BATH
1.30 to 3.30	NAP	NAP	NAP	NAP	NAP	NAP	NAP	NAP
3.30 to 4.00	SNACK	SNACK	SNACK	SNACK	SNACK/NAP	NAP/SNACK	NAP	NAP
4.00 to 4.30	CLASS/PLAY	CLASS/PLAY	CLASS/PLAY	CLASS/PLAY	CLASS/SNACK	SNACK/CLASS	SNACK	SNACK
4.30 to 5.00	CLASS/PLAY	CLASS/PLAY	CLASS/PLAY	CLASS/PLAY	CLASS/PLAY	CLASS/PLAY	CLASS/PLAY	CLASS/PLAY
5.00 to 6.00	FREE PLAY	FREE PLAY	FREE PLAY	FREE PLAY	FREE PLAY	FREE PLAY	FREE PLAY	FREE PLAY

Appendix B

Straits Times report on shortage of child care staff

Straits Times 18 Jan 1991

Childcare centres suffer shortage of trained staff

Centres opening faster than teachers can be hired and trained

18 JAN 1991 pg. 31 EOC, SM TE

By Francis Dorai

THE rapid mushrooming of childcare centres in Singapore has resulted in a shortage of trained staff to run these places.

And the low pay, long hours, lack of career opportunities and physical and mental demands of the job do not help the situation at all.

There are now 228 childcare centres offering 15,000 places, with a total staff strength of 2,000.

Thirty new centres, offering a total of 3,000 places, opened during the last seven months alone.

To encourage more mothers into the workforce, the Ministry of Community Development has targeted nearly 100 more childcare centres in the next five years to bring the number of places to 20,000. Another 40 are expected to open this year.

An additional 800 trained staff will be required to fill the vacancies.

Although MCD is confident of achieving this target, childcare centres are sceptical about recruiting and keeping sufficient staff.

A Straits Times check of 30 childcare centres turned up the consensus that the number of childcare teachers being hired and trained cannot keep pace with the rate of new centres being opened.

For instance, Mrs Gina Seah, principal of Jollies Childcare Centre, plans to open two new branches.

But with the already tight labour market, she said she was unsure whether she would be able to attract enough employees to run them.

There seems to be a vicious circle at work. The centres say that an insufficient number of teachers are being trained.

The MCD argues that the shortage exists because the centres are not willing to release their staff for training.

But Mrs Daphne Goon, the principal of Katong Park Child Development and Learning Centre, said: "If the centre is already shorthanded in the first place, then it is unlikely that the principal would be in a position to release a teacher a few hours a day for a course."

She added that some new teachers, who have not decided whether to make childcare a career, were unlikely to risk going for the course and being bonded to the centre.

Said Mrs Loh Ping Ping, the principal of Mothergoose Child Development Centre: "With so many new centres being opened, MCD should ensure that there are sufficient teachers being trained to staff these places."

The shortage is not only in trained staff; it is difficult to hire even untrained people.

Said Dr Khoo Kim Choo, the executive secretary of NTUC Childcare which runs 13 centres in Singapore: "One of the major problems which impede the opening of new centres is the shortage of untrained staff, much less trained ones."

The 14th NTUC childcare centre in Chua Chu Kang, for example, will only open if sufficient staff can be recruited.

Dr Khoo said that in a tight labour market situation, childcare centres are competing with other sectors of the economy for fresh O level holders.

The pay disparity is a major obstacle in attracting teachers. She said: "We pay new, untrained teachers $616, gross, a month. Some clerical jobs pay higher than this with shorter working hours as well."

The combination of low salary and long hours has resulted in job-hopping.

Mrs Gina Seah of Jollies Childcare Centre, who runs six other centres, said that while staff turnover at her schools is relatively low, job-hopping was common.

She said: "Once a teacher has the necessary qualifications and has gained sufficient experience, she will apply for better paying jobs at other centres.

"Also, because there is only one supervisor in each centre, a teacher who wishes to be promoted to that position will have to apply elsewhere."

One solution: Centres should motivate and encourage their staff with effective management, better fringe benefits and clear-cut career paths.

The Early Learning Centre has been able to retain its staff because of a fair remuneration package.

Mrs Samia El-Ibiary, of the centre, said that she pays a starting salary of $750, which is well above the market rate of $600, for an untrained teacher with three O levels.

Her teachers also receive 21 days' leave, which is more than what other centres are giving, she said.

Neither does Mrs El-Ibiary impose a bond on her teachers when she sends them on childcare courses.

Another solution is to look beyond Singapore for staff.

A consultant with Kinderland Educare Services, Dr Florence Lee, who conducts training for childcare teachers, said that her company — which runs three Kinderland childcare centres here — is looking at the possibility of hiring Malaysians.

Many of the principals agreed that teaching at childcare centres is physically and mentally demanding and many teachers resigned after a few months on the job.

Mrs Loh Ping Ping of Mothergoose Child Development Centre said: "It is not at all a glamorous job.

"A childcare teacher looks after the physical, social and moral development of a child.

"Sometimes, this means getting on your hands and knees cleaning up the mess after a child has urinated on the floor.

"Not many Singaporeans are willing to do that."

CHILDCARE TRAINING COURSES

- **Courses in childcare training are available through pre-service and in-service training conducted by three agencies, the Institute of Education, NTUC Childcare services and Kinderland Educare Services.**
- **Various courses leading up to certification are offered by these agencies.**
  The IE, for instance, offers part-time in-service programmes at the basic, intermediate and advanced levels for staff in existing childcare centres.
- **Such employees are bonded to their sponsors on completion of their training.**
  This can range from six to 18 months, depending on the course attended.
- **Full-time pre-service training is provided for members of the public by the IE leading up to qualifications in childcare.**
- **Under the training award scheme, candidates will paid a monthly allowance of $300 plus a fee grant of $1,200.**
  On completion, they have to serve a two-year bond during which they have to work in an approved childcare centre.
- **The basic qualification for entry into childcare courses or employment as a childcare teacher is a minimum of three O level passes, including a credit in English Language.**
- **The first IE course in February last year trained 70 people who are now deployed at childcare centres.**
  The second intake, which started in September last year, has 50 people under training.

Straits Times 24 Jun 1994

Urgent need to train more child care teachers

STRAITS TIMES

Serious staff shortage at most child care centres

24 JUN 1994

I REFER to the report "MCD to sponsor child care training awards (ST, June 22).

I applaud the Ministry of Community Development for sponsoring more child care training awards.

However, for the 30 new child care centres which will be opened by early next year, another 300 more child care teachers will be needed, and not just 200 as mentioned in the report.

If the ministry is going to train only one-third of the 200 teachers, which works out to about 70 teachers, where are the rest going to come from?

I shudder at the thought of these 30 new centres because I know that many of the trained staff from established centres operated by voluntary welfare organisations (VWOs) like ours, will be lured away by these new centres.

VWOs are operating child care centres as a service to the community.

Around 83 per cent of our income goes towards salaries, CPF contributions and staff training.

We are struggling constantly to improve our quality of care for children, but the question is how can we do so without staff, not to mention trained staff?

High staff turnover and staff shortage at most of the child care centres in Singapore have been horrendous over the last two years.

A look at the daily appointment columns in The Straits Times will reveal the fact.

Owing to shortage of staff, centres have had to compromise by making the already tired and stressed teachers do over-time work, or even take in temporary teachers who are not qualified or committed to child care.

According to child care experts, the first five years of a child's life are the most crucial and impressionable. Many hang-ups which adult carry with them are the result of adverse experiences in their early childhood.

It is time that we take a serious look at the quality of care and education that is being provided to pre-schoolers.

None of our universities or polytechnics provides courses in early child care.

MCD to sponsor child care training awards

THE Ministry of Community Development (MCD) is sponsoring training awards for child care teachers to meet increased demand next year.

A ministry press release said about 30 new child care centres are expected to be open by early next year and they will need another 200 child care teachers.

The awards are for the eight-month Full-Time Early Childhood Care and Education (Fundamental and Intermediate) Course run by Kinderland Learning Centre.

Applicants need at least three GCE 'O' level passes or equivalent qualifications, including English as a first language.

Existing workers in child care centres who have not completed a recognised child care course may also be considered under the sponsorship at their centres.

Successful applicants will have to work in approved child care centres for two years after the course.

Application

■ ST, June 22.

Many centres are depending on part-time six-month courses provided by private agencies.

These and the training awards sponsored by the MCD are just short-term measures.

I would like to know whether the ministry has a comprehensive long-term plan for child care centres in Singapore.

Providing grants and subsidies and giving out new licences each year do not help to boost quality.

GAN BEE CHIN (Mrs)
Deputy Director
The Presbyterian Welfare Services Singapore

Straits Times 10 Jul 1995

Few takers for MCD's child-care training awards

By Geraldine Kan

AVAILABLE. 70 places for a child-care teacher training course, with fees paid and a monthly allowance thrown in.

Number of takers for those places: only 20 so far.

The figures started to dip last year. From 1990 to 1993, more than 40 places were taken up yearly. Last year, this number dropped to 24.

At this rate, there could be a serious shortage of child-care teachers in the future, said the Ministry of Community Development (MCD) and child-care centre operators.

To attract potential teachers, MCD gives out training awards every year.

It pays the $2,270 fees for the Early Childhood Care and Education course and gives a $300 monthly allowance.

Graduates from the course have a two-year bond.

Some centres are already feeling the pinch.

"Some advertise for staff every day and there are no takers Absolutely none," said Mrs Daphne Fong-Goon, president of the Association of Childcare Educators.

Among the main reasons cited the low pay, the perception that child care has few prospects and the amount of time training takes.

The job is not easy, said Mrs Nancy Lee-Wong, director of Jenan Playcentre. Not only do children demand a lot of attention, but teachers also have to grapple with unreasonable parents sometimes.

The starting pay, from about $800 to $1,200, might be an added disincentive Some may feel that, for that kind of pay, clerical or sales jobs are easier, said Ms Judy Chan, owner of Romper Place Childcare and Development Centre.

Also, potential students might prefer to take the part-time version of the course in the evening while working, and earning an income, in the day, said Agnes Pang, licensee for Teddyland Childcare and Development Centre.

> 'Sure, other jobs pay better. But you get a lot more fulfilment in this job
>
> 'We even have people who felt their secretarial and banking jobs were dull, and switched to child care. With children, it's never boring.'
>
> — Dr Florence Lee, head of the Kinderland Learning Centre, which trains child-care teachers.

The situation could worsen when 80 new centres, projected to open this year and next, create vacancies for about 550 teachers, said MCD's assistant director of child-care operations, Mrs Ismail Ellias.

New centres are especially hard hit Some of them, she said, take in fewer children than they have capacity for in the first six months of operation because they cannot find enough teachers

An MCD spokesman, Mr Liew Choon Boon, said that, along with the child-care educators' association, the MCD is taking part in career exhibitions and increasing community outreach through seminars.

Career prospects can be good, said Mrs Fong-Goon, adding that teachers can work their way towards running their own centres.

Jenan Playcentre's Mrs Lee-Wong added that her teachers get two or three job offers a year.

For her, keeping her staff happy is a priority. As a perk, the centre paid for a four-day trip to Tioman for six teachers last year, and is subsidising one to Bangkok soon

Dr Florence Lee, head of the Kinderland Learning Centre, which trains child-care teachers, said that the job has its benefits.

"Sure, other jobs pay better," admitted Dr Lee. "But you get a lot more fulfilment in this job.

"We even have people who felt their secretarial and banking jobs were dull, and switched to child care. With children, it's never boring."

Appendix C

Straits Times report on children's homework with parents

Straits Times 14 May 1994

Don't drill children when they're too young, parents told

Why not p8 26 EOC

PARENTS are drilling their children in lessons at a younger age than previously, and this can do toddlers more harm than good, warns Mrs Serene Chan, a nursery school principal with a Masters degree in child psychology.

She said constant drilling can make children remember some things for a short time, but they forget easily if the regimen stops.

Being forced to learn by rote can also be traumatic for some children, who will then "shut off" and lose interest in learning.

Mrs Chan said this in a talk to parents at the Geylang East Branch Library on Friday night on how to teach young children mathematics.

She noticed that some parents drill numbers into children with flashcards showing the numeric figures, and getting children to repeat: "One, two, three..." etc.

This, she said, will only make the child think the word "one" is a name for the figure "1", instead of understanding it as a numerical concept to be applied to single objects and living things.

She advised parents to instead play with their children, and while doing so, count toys, meat balls, or anything on hand, with them.

Madam June Teo, principal of the Hongkah North People's Action Party kindergarten, told The Sunday Times that young children have an attention span of 20 to 30 minutes and should not be drilled for long periods.

She said: "Some parents have asked me to give tuition classes on top of the kindergarten classes to their K2 children. I refused."

She echoed Mrs Chan's concern that overkill can cause children to "switch off" and this can be especially harmful when they enter primary school.

■ Constant drilling can make children remember some things for a short time, but they forget easily if the regimen stops.

■ Being forced to learn by rote can be traumatic for some children who will then "shut off" and lose interest in learning.

She added that whereas parents used to ask why their three-year-olds in nursery were not being given worksheets yet, they now ask the same question earlier — when their two-year-olds are in playgroup.

Worksheets are often not feasible for young children who have not developed the motor skills to hold pens and write.

Mrs Chan also observed that parents five years ago worried about preparing their children for primary school; today, they worry about preparing them for kindergarten.

But perhaps the worst thing is parents' temporary enthusiasm. Said Madam Koh Siew Cheng, principal of Jalan Besar PAP kindergarten: "Some parents sign up their children for extra classes and then withdraw them after a few months. We had to close a language class because of this."

Straits Times 9 May 1995

Great demand for assessment books

BR SPO

9-5-87.

(C)

By SANDRA DAVIE

CALL it the *kia su* (afraid to lose out) syndrome, but there appears to be an insatiable demand for guide books and assessment books.

As a result, part-time and full-time writers have found themselves a lucrative line.

There are at least 10 local publishing firms — four of whom are major publishers — which turn out these volumes of supplementary notes and revision exercises for pupils of all levels.

The four major publishers said they had published 30 to 50 new assessment and guide books since January this year and many new writers had joined their ranks.

One of them, Dyna Publisher, started modestly in 1975 with only four or five such books, but now boasts of having published more than a few hundred titles.

The director of the firm, Mr Chui Fook Thim, 48, was a former teacher and started business with a few of his own books.

He said: "The demand for these books has increased tremendously over the past few years that I have now got more than 10 regular writers and many more groups of writers contributing."

Since the beginning of this year alone, he has published 20 to 30 new books and has signed on three new writers and one group which consists of about 10 writers.

The writers of such books are usually teachers, former teachers, professionals and undergraduates who are paid, on the average, a royalty of 10 to 12 per cent.

Mr Chang Choon Kean, the owner of another big publisher, Simyer Publications, said the bestsellers, which are usually English, Maths and Science assessment books, can sell as many as 30,000 copies a year

A retired teacher, Mrs I. Tan, started writing assessment books this year and has found it worth her while.

One of her English assessment books that went to the shops this February has already sold close to 1,000 copies.

Yesterday afternoon, there were many pupils browsing in the more than 20 bookshops at Bras Basah Complex, a haven for assessment and guide book hunters.

Secondary 3 pupil Serene Leong, who was at Popular Book Company, was "desperately looking" for guides to her literature books.

Serene, who buys new assessment books every other week, said: "I feel that I don't get enough exercises in school, and teachers never give enough notes."

A few parents were also there to hunt for the best and the latest in assessment books

One of them, Mr Tan Siew Thian, 48, was there during his lunch break to buy a literature guidebook for his daughter

He said. "My daughter is going through her exams and just didn't have the time to buy this book, which she says is going to make or break her literature exam."

Another parent, Mrs Iris Lim, 43, who was there to buy English assessment books for her son, said she did not have to hire a private tutor so long as there were enough assessment books to provide the extra practice needed at home.

Teachers interviewed felt there was no real need for guidebooks and assessment books and the demand was brought on more by the fact that we were an exam-oriented society.

A secondary school teacher, Mrs N Wong, said: "I feel that I give my pupils too much work, but their parents who are anxious about their performance pile them with more work."

According to the publishers interviewed, there are no regulations about who can write assessment books. But publishers have to submit copies of the book to the Ministry of Education if they wish to have its stamp of approval.

Appendix D

Letter seeking consent from day care centre supervisors

3rd September 1994

Dear

I write to ask for permission to use one of your daycare branches, Centre, as a research centre for my PhD project. At the moment, I am on study leave from the National Institute of Education, Singapore and is currently attached to the University of London, Institute of Education. Professor Kathy Sylva supervises my research. She has been to Singapore on two occasions. Once, as a keynote speaker in the 1990 National Kindergarten Conference organised by PAP Community Foundation, People's Association and the former Institute of Education. The other, as a consultant to the National Institute of Education in 1992.

The main purpose of my research is to investigate the environmental variations of daycare centres in Singapore and how it may possibly influence young children's development. Data collection and its timeframe is described below:

Phase 1: September - November 1994
This involves the profiling of the daycare centre, most of which is done by observation* of the centre's daily activities for two days.

Phase 2: January - February 1995
This involves 8-10 K1 or K2 children, randomly sampled. A set of cognitive and self-concept tasks will be given to them. These are hands-on tasks which are administered in a "play" way. In addition, their class teachers will be asked to complete two questionnaires relating to the children's social and emotional development.
Lastly, their parents will be asked to complete a questionnaire relating to their attitude towards their child's education.

Phase 3: March - April 1995
This will involve observations* of the children at various activities during the day. Each child will be observed for approximately 9 ten-minute occasions spread over the two months.

Phase 4: August - September 1995
The tasks and questionnaires used in phase 2 will be administered again.

Demographic data will also be collected about the children's home background, for e.g., age, position in family, parents' education, and childcare history.

I ask for your appreciation of how crucial and vital this research is to the improvement of daycare provisions for young children and preschool teachers in Singapore. Let me assure you that names of centers, parents and children will not be published at all and is strictly confidential.

* Observations are non-participant and observers are required to be unobtrusive.

I look forward to a favourable reply and thank you for your consideration. I can be reached at the following:

Division of Specialised Education
School of Education
National Institute of Education
469 Bukit Timah Road
Singapore 1025
Tel: 4605200
Fax: 4677808

Yours sincerely,

Celina K.D. Kwan (Ms)

cc. Prof Kathy Sylva

PS. Parental consent will be sought before data collection involving individual children begins. Advice on the timing of the administration of tasks will be sought from the teachers to minimise disruption of the children's lessons.

Appendix E

Letter seeking consent from parents

Dear parents, 10th September 1994

I am a PhD student at the University of London, Institute of Education, UK. At the moment I am in Singapore collecting data for my research in preschool education. I am interested in how environmental variations in daycare centers may possibly affect young children in Singapore. I am being supervised by Professor Kathy Sylva who has been to Singapore on the invitation of the PAP Community Foundation, People's Association and the former Institute of Education as keynote speaker in the 1990 National Kindergarten Conference. My research is also partly sponsored by the National Institute of Education at the Nanyang Technological University.

I write to seek your cooperation and consent in allowing me to conduct my research with you (questionnaires sent to you) and your child (tasks conducted at the centre) from January 1995 through January 1996. The following is a brief of the research phases:

Phase 1: Sept - Nov 1994
Profiling daycare centres (with consent of supervisor)

Phase 2: Jan - Feb 1995
Cognitive and social-emotional tasks administered to children.
Attitude towards children's education completed by parents.

Phase 3: Mar - Apr 1995
Observations of children's activities.

Phase 4: Aug - Sept 1995
Re-administration of phase 2 tasks and questionnaires.

Let me, at this point, assure you that all information collected will be **strictly confidential** and that names of centers, parents and children will not be published. The administration of tasks will be done in a "play" way and with class teacher's consultation to minimise disruption of children's lessons.

I ask for your appreciation of how crucial and vital this research will be to the contribution of improving preschool education for our young children in Singapore and your cooperation will be greatly needed and appreciated.

If you consent to this request, please fill in the consent form attached.

Please seal the forms in the envelope provided and return to your child's teacher by

If you have any queries, do not hesitate to ring me at
4605200
or write to me at
Division of Specialised Education
School of Education
National Institute of Education
469 Bukit Timah Road
Singapore 1025

Thank you very much for your kind consideration and I look forward to a favourable reply.

Yours sincerely,

Celina K.D. Kwan (Ms)

cc. Prof Kathy Sylva

Appendix F

Singaporean experts' criteria for judging 'high quality' day care environment

Experts' criteria for examining standards of provisions offered in a daycare environment

1. Room arrangement
   - child autonomy encouraged
   - adequate space
   - interest corners

2. Room displays
   - varied and stimulating
   - colourful

3. Learning materials and equipment
   - appropriate and varied
   - gross and fine motor skills included

4. Curriculum areas
   - appropriate and varied
   - periodical modification
   - meet group and individual needs
   - integrated areas
   - aesthetic and play activities included

5. Staff-child ratio
   - maximise interaction
   - adequate caregiving and attention

6. Staff teaching skill
   - awareness of child development
   - sensitivity to children's potential
   - providing appropriate experiences

7. Staff-parent involvement/relationship

Appendix G

Example of the ECERS scoring form

Name of Facility	Room	Age of Children youngest to oldest	Name of Rater	Position of Rater	Date
		to			

1 Greeting/departing

1 2 3 4 5 6 7

3 Nap/rest

1 2 3 4 5 6 7

5 *Personal grooming*

1 2 3 4 5 6 7

7 or◆7 Furnishings (learning)

1 2 3 4 5 6 7

9 Room arrangement

1 2 3 4 5 6 7

11 Understanding language

1 2 3 4 5 6 7

Total Personal Care (Items 1-5)

10 or◆10 Child related display

1 2 3 4 5 6 7

2 or◆2 Meals/snacks

1 2 3 4 5 6 7

4 Diapering/toileting

1 2 3 4 5 6 7

6 Furnishings (routine)

1 2 3 4 5 6 7

8 Furnishings (relaxation)

1 2 3 4 5 6 7

12 Using language

1 2 3 4 5 6 7

Total Furnishings/display (Items 6-10)

13 Reasoning

1 2 3 4 5 6 7

14 or ◆14. Informal language

1 2 3 4 5 6 7

Total Language/reasoning (Items 11-14)

15 Fine motor

1 2 3 4 5 6 7

16 Supervision (FM)

1 2 3 4 5 6 7

17 GM space

1 2 3 4 5 6 7

18 GM equipment

1 2 3 4 5 6 7

19 GM time

1 2 3 4 5 6 7

20 Supervision (GM)

1 2 3 4 5 6 7

Total Fine/gross Motor (Items 15-20)

21 Art

1 2 3 4 5 6 7

22 Music/movement

1 2 3 4 5 6 7

23 Blocks

1 2 3 4 5 6 7

24 Sand/water

1 2 3 4 5 6 7

25 Dramatic play

1 2 3 4 5 6 7

26 Schedule (creative)

1 2 3 4 5 6 7

27 Supervision (creative)

1 2 3 4 5 6 7

Total Creative Activities (Items 21-27)

28 Space (alone)

1 2 3 4 5 6 7

29 Free play

1 2 3 4 5 6 7

30 Group time

1 2 3 4 5 6 7

31 Cultural awareness

1 2 3 4 5 6 7

32 Tone

1 2 3 4 5 6 7

33 Exceptional provisions

1 2 3 4 5 6 7

Total Social Development (Items 28 33)

34 Adult personal area

1 2 3 4 5 6 7

35 Adult opportunities

1 2 3 4 5 6 7

36 Adult meeting area

1 2 3 4 5 6 7

37 Parent provisions

1 2 3 4 5 6 7

Total Adults (Items 34-37)

Appendix H

Target Child Method of Observation Coding Manual

(Sylva, Roy & Painter, 1980)

THE TARGET CHILD CODING MANUAL

SOCIAL CODES

This code analyses the observation in terms of the child's social interaction, or lack of it.

SOL	Solitary
PAIR	Two people together (target child plus one other child or adult)
SG	In a small group of three to five children.
LG	In a large group of six or more children.
/P	Sometimes, in a group of two or more children, the child appears to have little contact with the others. If he is playing or working on his own, despite the others around him, add a /P, for 'parallel' to social code.

Examples:

LG/P	means that the child sits or stands in a large group of children but does not interact with any of them.
PAIR/P	means that the child is near another but not playing or talking with him.
PAIR	would be the code if the child is chatting with a staff or peer.
SG	might be the code if the child is sitting in a small group engaged in conversation.

==========

TASK CODES

These categories describe the child's behaviour - what he was actually doing each minute. They include play behaviour such as pretend, art or manipulation, as well as non-play behaviour such as watching or cruising.

Note only the more prominent behaviour if the child engages in more than one category of behaviour a minute.

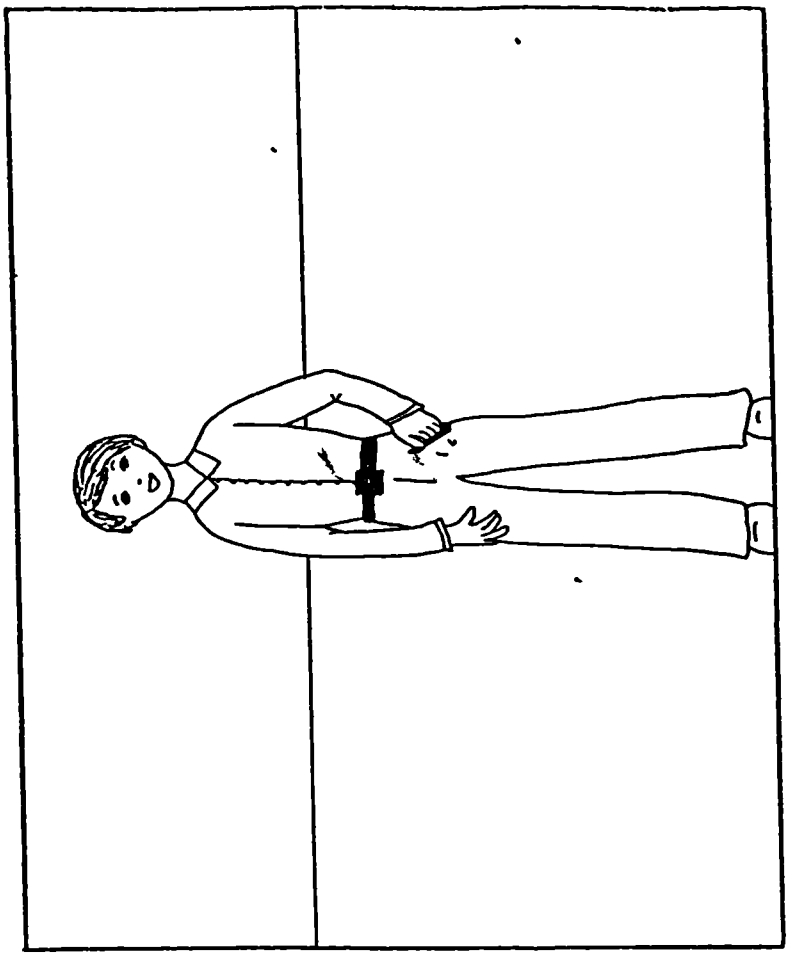
LMM	Large muscle movement. Active movement of the child's body, requiring coordination of larger muscles, such as running, climbing.
LSC	Large scale construction. Arranging and building dens, trains etc with large crates, blocks etc.
SSC	Small scale aconstruction.
ART	Art 'Free expression' creative activities such as painting, drawing, chalking, cutting, sticking.

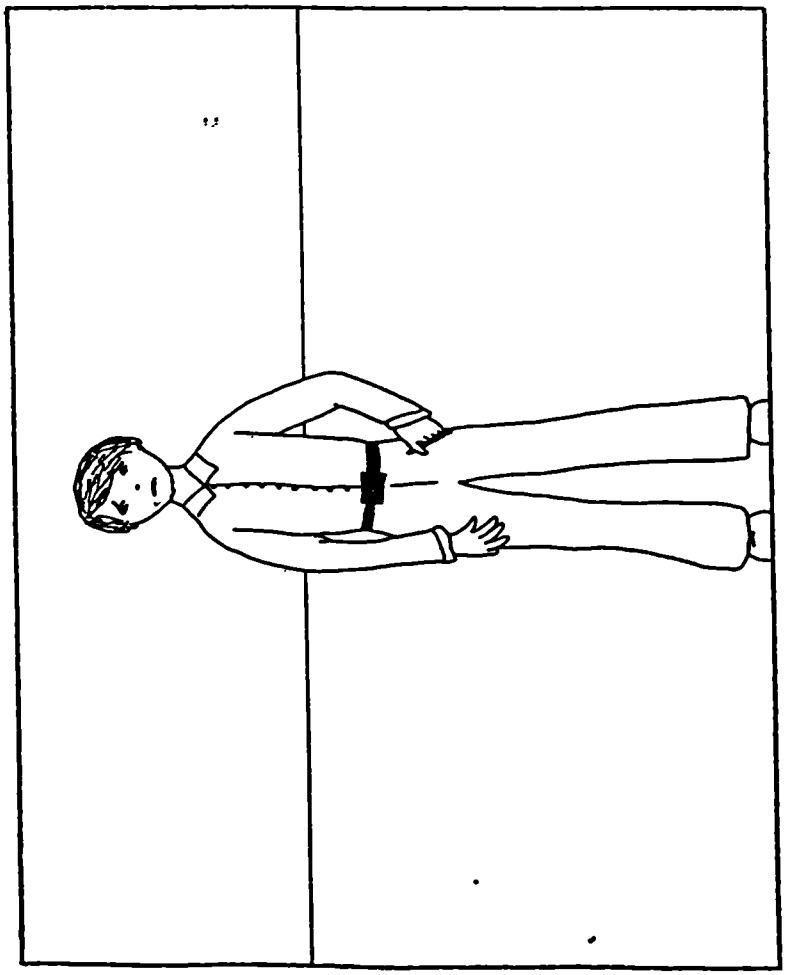
MAN	Manipulation The mastering or refining of manual skills requiring coordination of the had/arm and the senses: eg handling sand, dough, clay, water, etc. Also sewing, gardening, arranging and sorting objects.
ADM	Adult-directed art and manipulation. The child is mastering and refining skills and techniques under adult direction, and sometimes with an adult-determined end-product; eg tracing, directed collage.
SM	Structured materials The use of materials, with design constraints, eg jigsaw puzzles, peg-boards, templated, picture or shape matching materials, counting boards, shape posting boxes, bead-threading and sewing cards.
3Rs	Three Rs Activities Attempts at reading, writing or counting. It includes attentive looking at books
EX	Examination Careful examination of an object or material, eg looking through a magnifying glass. It differs from manipulation in that the looking, smelling or tasting is more important than the handling.
PS	Problem solving The child solves a 'problem' in a purposeful way using logical reasoning, eg looking to see why something won't work and then repairing it.
PRE	Pretend. The transformation of everyday objects, people or events so that their 'meaning' takes precedence over 'reality'.
SVT	Scale-version toys Arranging miniature objects, eg, dolls' houses, farm and zoo sets, transport toys, toy forts. It does not include use of toys such as prams, dolls and dishes. If miniature objects are used in pretend play, use previous category.
IG	Informal games A play situation, with or without language, where the child is playing an informal game with another child. These are spontaneously and loosely organised, eg following one another around whilte chanting, hiding in a corner and giggling, or holding hands and jumping.
GWR	Games with rules Includes ball games, skittles, circle games including singing games and board games such as snakes and ladders, dominoes, noughts and crosses, etc
MUS	Music LIstening to sounds, rhythms or music, playing instruments, singing solos and dancing.
DM	Decision-making.
A	Attention seeking (calling out to teacher or children)

PALGA	Passive adult-led group activities A large group of children, under the leadership of an adult, listen to stories, rhymes or finger plays, watch television, watch a planned demonstration (eg nature table, making popcorn) etc
SINP	Social interaction, non-play Social interaction , with another child or with an adult, verbal or physical, but definitely not play, with another child or with an adult. Eg chatting, borrowing, seeking or giving help or information to someone, aggressive behaviour (not play-fighting), teasing, interaction, non-play is used only when the child is not engaged in another task code category, eg, if he is doing a puzzle while chatting to a friend, code it as structure materials.
DB	Distress behaviour Seeking comfort or attention from adult or other child. He must show visible signs of distress or make a visible bid for comfort, eg prolonged crying, wanton destruction of materials, social withdrawal.
SA/AWG	Standing around, aimless wander or gaze The child is not actively engaged in a task or watching a specific event.
CR	Cruise Active movement around from one thing to another, or purposful looking around, when the child appears to be searching for something to do.
PM	Purposeful movement Purposeful movement towards an object, person or place: eg, searching for an object, going outdoors, crossing the room to another activity.
W	Wait The child's time of inactivty while waiting for adult or child.
WA	Watching Watching other people or events. The child may watch a specific person or activity, or look around in general. Includes listening-in to conversations without participating
DA	Domestic activity Includes going to the toilet, hand washing, dressing, arrival and departure, rest, tidying up, milk, snack or meal.

Appendix I

Example of items from the Pictorial Scale of Perceived Competence and Social Acceptance for Young Children (Harter, 1984)





SAMPLE QUESTION

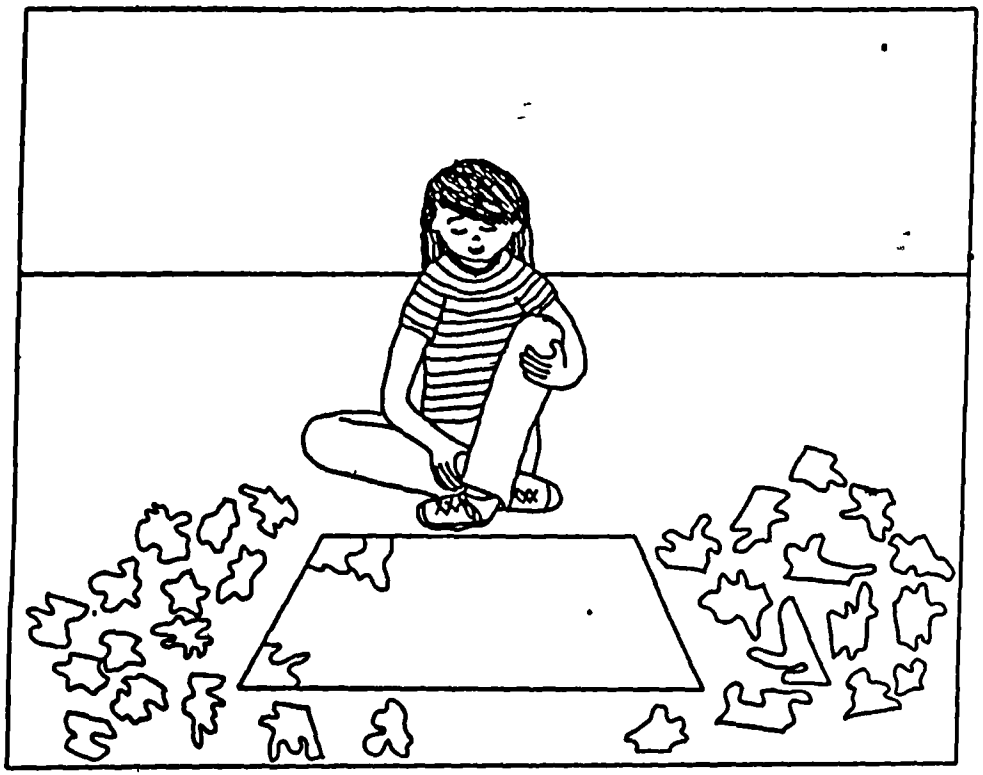
This boy is usually kind of happy
Are you.

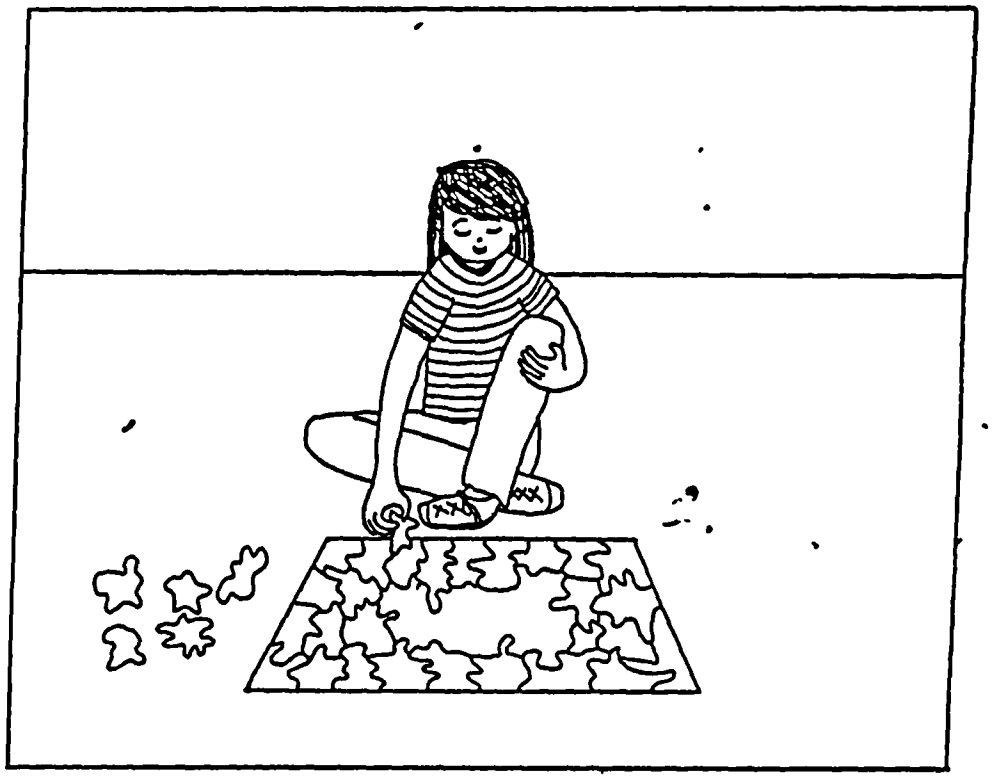
Always happy OR Usually happy

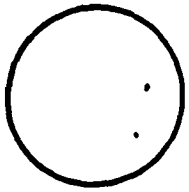
This boy is usually kind of sad

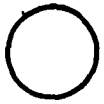
Are you

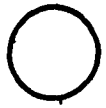
Usually sad OR Always sad

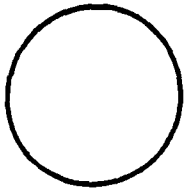








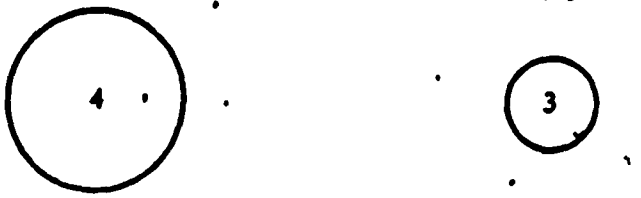




ITEM 1

girl
This ~~boy~~ is pretty good at puzzles.
Are you:

Really good at puzzles OR Pretty good



girl
This ~~boy~~ isn't very good at puzzles.
Are you.

Sort of good OR Not very good at puzzles

Appendix J

Classroom Behaviour Inventory

(Schaefer & Edgerton, 1978)

Classroom Behavior Inventory--Preschool Form
60-Item Research Version

Cover Sheet

Child's name:_____

Sex:_____

Teacher's name:_____

Centre:_____

Instructions

Research has shown that teachers and day care workers can provide valid ratings that contribute to understanding of child behaviour in group settings. Please describe as accurately as possible the behaviour of the child listed above by circling one of the five responses to each item. The information you provide will be most valid and useful if you follow the following instructions.

BASE YOUR RESPONSE UPON YOUR PERSONAL OBSERVATION AND EXPERIENCE.

GIVE A RESPONSE TO EVERY ITEM BASED UPON YOUR BEST ESTIMATE.

DO NOT HESITATE TO USE EXTREME RATINGS WHEN THEY SEEM APPROPRIATE.

DESCRIBE THE CHILD AS COMPARED WITH CHILDREN OF THAT AGE GROUP. FOR EXAMPLE, YOU WOULD RATE A THREE-YEAR-OLD VERY MUCH LIKE THE ITEM, "UNDERSTANDS DIFFICULT WORD" IF HE UNDERSTANDS MORE DIFFICULT WORDS THAN THE AVERAGE THREE-YEAR-OLD.

Thank you for sharing your observations of child behaviour.

Celina Kwan

	Not at all like	Very little like	Some what like	Much like	Very much like
1. Is quick to grasp the meaning of what he is told.	1	2	3	4	5
2. Awaits his turn willingly.	1	2	3	4	5
3. Wants my help when it's not really needed.	1	2	3	4	5
4. Works earnestly, doesn't take it lightly.	1	2	3	4	5
5. Laughs and smiles easily and spontaneously.	1	2	3	4	5
6. Tries to get even with a child with whom he is angry.	1	2	3	4	5
7. Does interesting and original things.	1	2	3	4	5
8. Uses long words and sentences for his age.	1	2	3	4	5
9. Has a low, unsteady or uncertain voice when speaking to a teacher or group of children.	1	2	3	4	5
10. Tries not to do or say anything that would hurt another.	1	2	3	4	5
11. Stays with a job until it is finished, even if it is difficult.	1	2	3	4	5
12. Often fails to react to classroom activities.	1	2	3	4	5
13. Does not wait for others to approach him but seeks others out.	1	2	3	4	5
14. Shows curiosity about many things.	1	2	3	4	5
15. Is quickly distracted by noise and activity.	1	2	3	4	5
16. Tries to do things for himself.	1	2	3	4	5
17. Understands difficult words.	1	2	3	4	5
18. Asks me to do even simple things for him.	1	2	3	4	5
19. Works carefully and does his best.	1	2	3	4	5
20. Likes to talk or socialise with other children.	1	2	3	4	5

	Not at all like	Very little like	Some what like	Much like	Very much like
21. Grabs what he wants and will fight for it.	1	2	3	4	5
22. Works or plays without needing help.	1	2	3	4	5
23. Uses a large and varied vocabulary for his age.	1	2	3	4	5
24. Tends to withdraw and isolate himself, even when he is supposed to be in a group.	1	2	3	4	5
25. Is agreeable and easy to get along with.	1	2	3	4	5
26. Pays attention to what he is doing and is not easily distracted.	1	2	3	4	5
27. Shows little interest in special events or activities.	1	2	3	4	5
28. Is almost always light-hearted and cheerful.	1	2	3	4	5
29. Uses materials in imaginative ways.	1	2	3	4	5
30. Easily loses interest in what he is doing.	1	2	3	4	5
31. Likes to decide for himself what to do.	1	2	3	4	5
32. Gives a good report of what he has seen or done.	1	2	3	4	5
33. Prefers to be told exactly what to do and to have help getting started.	1	2	3	4	5
34. Attends to the task to be done.	1	2	3	4	5
35. Tries to be with another child or group of children	1	2	3	4	5
36. Gets angry quickly when prevented from doing what he wants.	1	2	3	4	5
37. Keeps busy for long periods of time without the teacher.	1	2	3	4	5
38. Understands and remembers instructions from the teacher.	1	2	3	4	5
39. Is usually sad, solemn, and serious looking.	1	2	3	4	5
40. Is easy to manage.	1	2	3	4	5

	Not at all like	Very little like	Some what like	Much like	Very much like
41. Thinks up interesting things to do.	1	2	3	4	5
42. Switches from one activity to another frequently.	1	2	3	4	5
43. Has a good fund of information for a child his age.	1	2	3	4	5
44. Shares toys or materials willingly when asked to.	1	2	3	4	5
45. Wants my help for problems he could solve alone.	1	2	3	4	5
46. Listens carefully and follows instructions.	1	2	3	4	5
47. Remains passive even when presented with an interesting stimulus.	1	2	3	4	5
48. Has lots of ideas for pretend activities.	1	2	3	4	5
49. Is good at repeating instructions from the teacher.	1	2	3	4	5
50. Is uncomfortable with people; would rather not be noticed.	1	2	3	4	5
51. Is slow to anger.	1	2	3	4	5
52. Has a low level of interest and enthusiasm.	1	2	3	4	5
53. Tries to make friends by talking, smiling, or sharing.	1	2	3	4	5
54. Shows strong interesting learning new things.	1	2	3	4	5
55. Forgets what he was doing and goes on to something else on the slightest distraction.	1	2	3	4	5
56. Likes to go ahead with things on his own.	1	2	3	4	5
57. Gives correct answers to questions from teachers or peers.	1	2	3	4	5
58. Hurts or annoys other children.	1	2	3	4	5
59. Takes initiative in choosing activities.	1	2	3	4	5
60. Quickly learns the rules for a new game or acitivity.	1	2	3	4	5

Appendix K

Rank Order of Parental Values

(Schaefer & Edgerton, 1977)

Child's Name:_____

8th February 1995

Dear parents,

Re: Research in Preschool Education in Singapore.

In connection with my main research, I would like to conduct a survey to find out what parents feel is important for their child to learn.

Please complete the questionnaire attached and return it in the envelope to your child's class teacher by _____.

Thank you for your support.

With regards,

Celina Kwan
National Institute of Education

Part A: Please tick the appropriate answer.

1. Have you bought any books (include magazines and encyclopaedias but not academic workbooks) for your child within the last year? If yes, please approximate the number of storybooks.

◊ Less than 6 books
◊ 6 - 11 books
◊ 12 -24 books
◊ More than 24 books

2. Do you take your child to the library? If yes, how often?

◊ Rarely
◊ Once a month
◊ 2 - 3 times a month
◊ 4 times a month
◊ More 4 times a month

3. Do you read books (include magazines and encyclopaedias) with your child? If yes, how often?

◊ Rarely
◊ Once a week
◊ 2 - 3 times a week
◊ 4 - 6 times a week
◊ Every day

4. Do you use published academic workbooks to teach your child reading, writing and mathematics? If yes, how often?

◊ Rarely
◊ Once a week
◊ 2 - 3 times a week
◊ 4 - 6 times a week
◊ Every day

Part B

The following are three sets of statements describing something most parents feel is important for their child to learn. With each set, please rank order the importance of each item to you for your child.

1 for **most** important
2 for **second** most important
3 for **third** most important
4 for **fourth** most important
5 for **fifth** most important

Example: Order the importance of each activity in your life.

a.	working	4
b.	eating	5
c.	sleeping	3
d.	socialising	2
e.	reading	1

Set 1: Order the importance of the following items you feel is important for your child to learn.

a.	to think for him/herself	_____
b.	to keep him/herself and his/her clothes clean.	_____
c.	to be curious about many things	_____
d.	to be polite to adults	_____
e.	to be kind to other children	_____

Set 2: Order the importance of the following items you feel is important for your child to learn

a.	to obey parents and teachers	_____
b.	to be responsible for his/her own work	_____
c.	to be kind and considerate	_____
d.	to keep things neat and in order	_____
e.	to use imagination	_____

Set 3: Order the importance of the following items you feel is important for your child to learn.

a.	interest in how and why things happen	_____
b.	ability to get along with people	_____
c.	being a good student	_____
d.	ability to look after him/herself	_____
e.	good manners	_____

Appendix L

Child and Family Background Questionnaire

Survey Form

Please fill in the blanks or tick in the appropriate symbols (◊). Thank you.

Information about child

1. Name of child: _____
2. Date of birth: _____
3. Address: _____

   _____

   _____

4. Tel: _____

5. Sex:

◊ 1 Female

◊ 2 Male

6. Child's position in family:

◊ 1 Only child

◊ 2 First

◊ 3 Second or latter

7. Number of children in family:

◊ 1 One

◊ 2 Two

◊ 3 Three

◊ 4 Four or more

8. Family structure in household:

◊ 1 Both parents and grandparent(s) present

◊ 2 Both parents present

◊ 3 Mother and grandparent(s) present

◊ 4 Mother present only

◊ 5 Father and grandparent(s) present

◊ 6 Father present only

◊ 7 Grandparent(s) only

9. Ethnic group:

◊ 1 Chinese

◊ 2 Malay

◊ 3 Indian

◊ 4 Others, please specify: _____

10. Religion

◊ 1 Christian

◊ 2 Buddhist

◊ 3 Hindu

◊ 4 Others, please specify: _____

11. Main language spoken at home:

◊ 1 English

◊ 2 Mandarin

◊ 3 Other Chinese dialiect, please state:

◊ 4 Malay

◊ 5 Tamil

◊ 6 Others, please specify: _____

12. Please describe previous types of childcare provisions (e.g. maternal care, grandparents, relatives, foster mother, other creches or daycare centers) before attending current daycare centre.

Type _____ Period(mths) _____

1. _____

2. _____

3. _____

4. _____

13. Is there a full-time maid at home to help with childcare?

◊ 1 Yes

◊ 2 No

14. Does your child get extra classes or tuition besides attending daycare center?

◊ 1 Yes*

◊ 2 No

*15. If yes, please tick in what areas:

◊ 1 Mathematics

◊ 2 English

◊ 3 Mandarin

◊ 4 Other second language, please state:_____

◊ 5 Computer

◊ 6 Music

◊ 7 Visual art

◊ 8 Dance

◊ 9 Speech and drama

◊ 10 Sports, _____

◊ 11 Others, _____

Information about mother

16. Mother's name: _____ 17. Date of Birth:_____

18. Mother's highest academic qualification obtained:

◊ 1 No education

◊ 2 Primary level

◊ 3 Secondary

◊ 4 Passed 'O' levels

◊ 5 Vocational Inst.

◊ 6 Passed 'A' levels

◊ 7 Degree

◊ 8 Postgraduate degree

◊ 9 Others, please specify: _____

19. Mother's occupation:

◊ 1 Professional

◊ 2Administrative, managerial & executive workers

◊ 3 Clerical

◊ 4 Sales & service

◊ 5 Production, transport & other manual workers

◊ 6 Agricultural workers & fishermen

◊ 7 Others, please specify: _____

20. If mother has lived overseas for more than 6 months before, please state:

Where: _____ Length of stay:_____

Reason_____

21. Mother's ethnic group

◊ 1 Chinese
◊ 2 Malay
◊ 3 Indian
◊ 4 Others, please specify: _____

Information about father

22. Father's name: _____ 23. Date of birth:_____

24. Father's highest academic qualification obtained:

◊ 1 No education
◊ 2 Primary level
◊ 3 Secondary
◊ 4 Passed 'O' levels
◊ 5 Vocational Inst.
◊ 6 Passed 'A' levels
◊ 7 Degree
◊ 8 Postgraduate degree
◊ 9 Others, please specify: _____

25. Father's occupation:

◊ 1 Professional
◊ 2 Administrative, managerial & executive workers
◊ 3 Clerical
◊ 4 Sale & service
◊ 5 Production, transport & other manual workers
◊ 6 Agricultural workers & fishermen
◊ 7 Others, please specify: _____

26. If father has lived overseas for more than 6 months before, please state:
Where: _____ Length of stay:_____
Reason:_____

27. Father's ethnic group

◊ 1 Chinese
◊ 2 Malay
◊ 3 Indian
◊ 4 Others, please specify: _____

Appendix M

Descriptive results of the ECERS administered in Singapore

Mean Scores on ECERS Items Across the Centres

On examining items of the ECERS shown in table A.1, results showed that most of the items from *personal care, fine/gross motor* and *creative activities* subscales had scores above three which was the minimal 'quality' rated. This indicates that in Singapore, most of the centres appeared to provide well for areas of domestic, outdoor (gross) and open-ended activities. The highest mean score was *music and movement* (m=4.50) with *gross motor supervision* (m=4.44) and *parent provision* (m=4.19) following. At fourth and fifth ranking were *sand and water play* (m=4.19) and *gross motor time* (m=4.06). *Gross motor equipment* (m=4.06) and *creative schedule* (m=3.81) secured sixth and seventh place respectively. On examining the distribution of these items, it appeared that these were within normal range and none of the centres scored a seven on the rating scale which represented 'excellent quality'.

Looking at those items that scored below minimal 'quality' (below score of 3), it appeared that *furnishings and display, language-reasoning experiences, social development* and *adult needs* did not meet the required standards. *Provision of exceptional needs* scored the lowest mean (m=1.69) with *cultural awareness* (m=2.00) and *room arrangements* (m=2.31) following. The next two ranks of lowest scores were *adult personal area* (m=2.31) and *reasoning activities* (m=2.44). It also appeared that most of these lower ranking items had more variability and marginally wider range of scores. This meant that there was more variation of 'quality' amongst these areas of provisions in Singapore. It is also noted that for both *exceptional needs provision* and *room arrangement* items, the distribution of scores were positively skewed. This indicated that for these items, most of the centres had lower scores.

It is also noted with reference to table A.1, that *meals*, although scored an above minimal rating on the ECERS (m=3.44), was positively skewed indicating that most centres were rated at the lower end of the range of scores (3 to 5). On the other hand, *adult meeting area* (range =1-3), *nap* (range =1-4) and *toileting* (range = 2-5) were found to be negatively skewed which indicated most of the centres had scores in the higher end of the range.

Table A.1

Descriptive statistics of ECERS Items by Ascending Order of Means

ECERS Items[1]	Mean	S.D.	Range	Skewness
Exceptional provision (6)	1.69	1.2	1.00-4.00	1.50
Cultural awareness (6)	2.00	1.15	1.00-4.00	0.89
Room arrangement (2)	2.31	1.35	1.00-5.00	1.01
Adult personal area (7)	2.31	0.87	1.00-3.00	-0.71
Reasoning (3)	2.44	1.21	1.00-5.00	0.55
Furnishing for relaxation (2)	2.44	1.41	1.00-5.00	0.71
Informal language (3)	2.56	1.75	1.00-5.00	0.44
Art (5)	2.69	1.40	1.00-5.00	0.14
Space to be alone (6)	2.69	1.14	1.00-5.00	-0.22
Group time (6)	2.69	1.20	1.00-5.00	-0.11
Adult meeting area (7)	2.75	0.68	1.00-3.00	-2.51
Understanding language (3)	2.75	1.29	1.00-5.00	-0.11
Nap/rest (1)	2.81	0.66	1.00-4.00	-1.43
Fine motor supervision (4)	2.81	1.22	1.00-5.00	-0.34
Furnishing for learning (4)	2.88	0.96	1.00-4.00	-0.77
Blocks (5)	2.88	1.26	1.00-5.00	-0.19
Free play (6)	2.94	0.44	2.00-4.00	-0.39

[1] Numbers in brackets represents subscales:
(1) Personal care & routine
(2) Furnishings & display
(3) Language-reasoning experiences
(4) Fine /gross motor
(5) Creative activities
(6) Social development
(7) Adult needs

Table A.1 (contd)

Descriptive statistics of ECERS Items by Ascending Order of Means

ECERS Items[1]	Mean	S.D.	Range	Skewness
Furnishing for routine (2)	3.06	1.12	1.00-5.00	-0.46
Fine motor (4)	3.06	0.68	2.00-4.00	-0.07
Dramatic play (5)	3.13	1.09	1.00-5.00	-0.63
Child related display (2)	3.19	1.11	2.00-6.00	0.92
Personal grooming (1)	3.25	1.24	1.00-5.00	-0.54
Using language (3)	3.25	1.24	1.00-6.00	0.18
Adult opportunities (7)	3.31	0.79	2.00-5.00	0.25
Greeting/departing (1)	3.37	0.62	2.00-4.00	-0.42
Creative activities supervision (5)	3.44	1.36	1.00-5.00	-0.39
Meals/snack (1)	3.44	0.73	3.00-5.00	1.43
Gross motor space (4)	3.56	0.73	2.00-5.00	-0.25
Toileting (1)	3.62	0.89	2.00-5.00	-1.09
Tone (6)	3.75	0.86	2.00-5.00	-0.18
Creative schedule (5)	3.81	1.17	2.00-5.00	-0.45
Gross motor equipment (4)	4.06	0.85	2.00-5.00	-0.86
Gross motor time (4)	4.06	0.68	3.00-5.00	-0.07
Sand/water (5)	4.19	0.83	3.00-5.00	-0.39
Parent provision (7)	4.19	0.75	3.00-6.00	0.75
Gross motor supervision (4)	4.44	0.89	3.00-6.00	0.21
Music & movement (5)	4.50	0.52	4.00-5.00	0.00

[1] Numbers in brackets represents subscales:
(1) Personal care & routine
(2) Furnishings & display
(3) Language-reasoning experiences
(4) Fine /gross motor
(5) Creative activities
(6) Social development
(7) Adult needs

Mean Scores on ECERS Subscales Across Centres

Table A.2 shows the results of the subscales and indicated that most centres were rated within the minimal standard of provision on the ECERS (m= 3.15, range=2.51-3.95). It appeared that on global assessment of 'quality' Singapore centres were neither very bad or very good and indicated homogeneity of standards. Comparing the ratings between subscales, *fine and gross motor activities* had the highest (m=3.67) with *creative activities* (m=3.52) and *personal care and routine* (m=3.34) following. *Adult needs* scored the next highest (m=3.14). The other subscales scored below minimal 'quality' (under 3). *Personal care and routine* appeaedr to be negatively skewed which meant that most of the centres were rated on the higher end of the range of scores.

Table A.2

Mean Scores on ECERS Subscales and Standard Deviations, Range and Skewness

ECERS Subscales	Mean	S.D.	Range	Skewness
Personal care & routine	3.34	0.56	2.00-4.00	-1.79
Furnishings & display	2.76	0.72	1.80-4.40	0.75
Language-reasoning	2.75	1.08	1.00-4.75	0.06
Fine/gross motor	3.67	0.52	2.67-4.83	0.22
Creative activities	3.52	0.63	2.57-4.29	-0.20
Social development	2.64	0.58	1.83-3.83	0.59
Adult needs	3.14	0.41	2.25-4.00	-0.34
Total	3.15	0.46	2.51-3.95	-0.02

To sum then, in the Singapore, day care centres appeared to provide average or around minimal 'quality' of provision on the ECERS rating. Specifically, items that related to

personal care and routine, *gross and fine motor actvities* and *creative activities* seemed to be better provided amongst the centres. This was not so with areas that related to *furnishings and display*, *language-reasoning experiences*, *social development* and *adult needs* which had a lower than minimal rating. However, on these subscales, the items appeared to be more varied in 'quality' compared with the subscales at the higher end. In contrast, the items from domestic, physical and creative areas appeaedr to be more homogeneous in 'quality' of provision. It can be said that Singapore centres are characterised by more variability in lower 'quality' features and more homogeneity in higher 'quality' features of the day care environment.

Intercorrelations of ECERS Subscales

There are very few psychometric investigations into the ECERS, however, it is has been argued by Scarr, Eisenberg and Deater-Deckard (1994) that many of the items in the measure are redundant. In their analyses, the investigators found that a single quality factor consisting of no more than 12 items from the scale was adequate to obtain relability and validity. They found these 12 items correlated highly with each other and with the total score. High correlations between subscales was also obtained in another study by Munton, Rowland, Mooney and Lera (1996). They obtained a correlation coefficent range of 0.41 to 0.80 in their analyses. Also, the results of factor analysis suggested that the subscales scores can be aggregated into one unitary measure of quality. Other studies like Karrby and Giota (1994) in Sweden found subscales correlations that ranged from 0.14 to 0.79 and Chin-Quee and Scarr (1994) obtained a narrower range of 0.62 to 0.92 in their follow-up study in Bermuda. This seemed to imply that total scores of ECERS is sufficient to measure 'quality'. Scarr and

her team (1994) brought this further by suggesting that 12 items were enough to represent a global assessment.

However, a global indicator of 'quality' is not enough information to assist practitioners and programme evaluators in improving the day care environment for child development. The different aspects of the environment in the ECERS has practical value in providing specific information. Not all studies have found high correlations within the ECERS and their results suggested that a total score may not be sufficient enough to predict child outcomes. For example, in Canterbury, New Zealand, Farquhar (1989) observed eight preschools using the ECERS and found that only six items from the instrument were correlated with the total ECERS score. These were *tone*, *greeting*, *departing*, *supervision for fine motor activities*, *sand/water provisions*, *space to be alone* and *reasoning experiences*. The coefficient range reported was 0.71 to 0.90.

Another study by Beller et al (1996) investigated the 'quality' of 30 day care centres in Munich, Germany. In contrast to other results, Beller and his team found low correlations among the subscales with coefficients that range from 0.03 to 0.62 with a median of 0.30. The study also reported differential predictiveness of each subscale on child outcomes. For example, *personal care*, *language-reasoning* and *adult needs* predicted most of the post-developmental scores in their study. This was not found with the other subscales.

Lera, Owen and Moss (1996) compared the various aspects of provisions between British local authority day nurseries, private day nurseries, nursery classes and playgroups using the

ECERS. The researchers found that within each type of preschool provision, there was a variation of 'quality' for each ECERS subscales. This indicated that the subscales were measuring different aspects of the environment. From the studies cited, it appeared that the inconsistent results obtained from the ECERS is culture specific. Different countries have reported on different degrees of relationships between subscales and variations of predictibility on child outcomes. Therefore, because of inconsistent findings, this research has taken a more cautious and conservative approach by examining each subscale on their predictibility of child outcomes.

Table A.3 shows the correlations between the total score and subscales of the ECERS applied in Singapore. The range of correlations appeared to be very broad, ranging from -0.08 to 0.87. Only four subscales, *language-reasoning experiences*, *creative activities*, *social development* and *furnishing and display* were significantly correlated with a range of 0.64 to 0.87. The positive relationships seemed to suggest that centres that scored high on one of these subscales will score high on the others also. Bearing in mind that the ECERS results can be culture specific and for reasons of informing good practice, this research took the more prudent stance in investigating each subscale on its predictiveness of child outcomes.

Tabe A.3

Inter-correlations between Scores of Total ECERS and Subscales

	Total	Lang-reason	Creative	Social	Furnish & display	Fine & gross	Personal & care	Adult needs
Total		0.92**	0.82**	0.90**	0.86**	0.45+	0.54*	0.12
Lang-reason			0.87**	0.79**	0.74**	0.33	0.35	-0.08
Creative activities				0.68**	0.64**	0.19	0.23	-0.09
Social develop					0.75**	0.29	0.40	0.35
Furnish & display						0.26	0.49+	0.09
Fine & gross							0.19	-0.13
Personal & care								0.03

** $p < 0.01$ * $p < 0.05$ + $p<0.10$

Appendix N

Raw Scores for frequency of type of task as measured by the

Target Child Method of Observation

c:\phd\phd data\tcen_frq.sav

	centre	tc_cogni	tc_creat	tc_dayro	tc_distb	tc_fgmot	tc_noprt	tc_socl	tc_group
1	1	130	28	147	0	34	150	15	296
2	2	87	74	196	0	69	55	2	317
3	3	132	98	115	0	137	95	4	219
4	4	231	31	140	18	33	159	16	172
5	5	135	0	148	0	20	137	0	360
6	7	89	111	150	0	114	110	7	219
7	8	128	119	103	0	67	152	11	220
8	9	235	50	109	0	182	88	6	130
9	10	97	87	163	0	122	71	1	259
10	11	207	43	140	0	246	56	1	107
11	12	106	88	144	15	99	160	3	185
12	13	134	69	214	0	0	85	0	298
13	14	217	129	120	0	108	80	7	139
14	16	121	73	137	2	91	116	7	253
15	17	201	94	97	3	86	90	28	201
16	18	116	110	128	18	90	185	25	128

Appendix O

Raw scores for frequency of type of social interactions as measured by the Target Child Method of Observation

c:\phd\phd data\tcen_frq.sav

	centre	s_alone	s_pair	s_smgrp	s_lggrp
1	1	41.00	43.00	166.00	550.00
2	2	50.00	9.00	72.00	669.00
3	3	66.00	52.00	211.00	471.00
4	4	46.00	66.00	306.00	382.00
5	5	19.00	33.00	140.00	608.00
6	7	55.00	107.00	189.00	449.00
7	8	30.00	26.00	192.00	552.00
8	9	39.00	18.00	166.00	577.00
9	10	19.00	24.00	272.00	485.00
10	11	14.00	20.00	37.00	729.00
11	12	40.00	59.00	215.00	486.00
12	13	8.00	13.00	89.00	690.00
13	14	25.00	95.00	113.00	567.00
14	16	34.00	22.00	104.00	640.00
15	17	28.00	40.00	214.00	518.00
16	18	44.00	122.00	242.00	392.00